**COVER PAGE**

1. **Project Title:** Community-Led Air Quality Monitoring in Marin City
2. **Applicant Information**
    - Applicant Organization: Play Marin as Fiscal Sponsor on behalf of Marin City Climate Resilience and Health Justice (MCCRHJ)
    - Address: 630 Drake Avenue, Marin City, 94965
    - Primary contact: Terrie Green; Executive Director, MCCRHJ
    - Phone: (415) 336-6421
    - Email: terriegreen@marincityclimateresilience.org
    - DUNS Number: 113073703
3. **Set-Aside: Community-based organization set-aside:** Play Marin and MCCRHJ represent the Marin City community in Marin County, California, a disadvantaged, underserved, and overburdened community impacted by multiple pollution sources that falls in the 99th percentile for traffic exposure in the California EPA's CalEnviroscreen which measures social vulnerability and pollution burden.
4. **Description of Applicant Organization:** MCCRHJ is an African-American led environmental justice organization based in Marin City, California, made up of community members and allies advocating for climate resilience and health justice for one of the most vulnerable communities in the County of Marin. Their work seeks to establish equitable inclusion in planning and community preparedness, as well as the equitable allocation of resources. MCCRHJ is working on adaptation to climate change and sea level rise (including emergency and hazard mitigation planning), and the health impacts of pollution (water, air and soil quality), while promoting community engagement and social equity through its involvement in programs such as the Bay Area Integrated Regional Water Management Disadvantaged Community and Tribal Involvement Program and the Bay Area Air Quality Management District's James Cary Smith grant program.
5. **Project Partners and Primary Contact**
    - Play Marin- Paul Austin
    - Bay Air Center/Bay Area Air Quality Management District- Tim Dye
    - Hyphae Design Labs- Brent Bucknum
6. **Project Location**: Marin City, CA, 94965
7. **Air Pollutant Scope**: PM2.5, NO2, BC, VOCs
8. **Budget Summary**

| EPA Funding Requested | Total Project Cost |
|---|---|
| $499,828 | $659,828 (160,000 in-kind) |

9. **Project Period:** 24 months
10. **Short Project Description**: MCCRHJ proposes a project to deploy a strategically placed network of air quality monitors for PM2.5, NO2, and BC that will be maintained by the community, and train community members to conduct traffic counts and indoor air monitoring for potential health triggers. Air quality data collected through this project will be analyzed and interpreted with the Marin City community and used for modeling interventions and planning for action to protect public health.

**WORKPLAN**
**Section 1-Project Summary and Approach**

**A. Overall Project**
**Task 0: Administration and Partner Coordination**
Play Marin will serve as fiscal sponsor. MCCRHJ will coordinate with partners, administer funds, and report on grant activities. MCCRHJ, the Bay Air Center, and Hyphae Design Labs (Hyphae) will participate in coordination meetings.

**Task 1: Design network of PM2.5 and black carbon sensors informed by initial CFD modeling and develop monitoring plan**
MCCRHJ will work with the Bay Air Center and Hyphae to design a network of PM2.5 and black carbon sensors to address the current data gap and collect air quality information in Marin City. Due to the current lack of information about air quality and pollutants in the area, modeling allows the efficient and cost-effective collection of data from strategically placed air monitors. Hyphae will specifically develop a digital twin model of the physical environment in Marin City utilizing lidar ad site investigation. Hyphae will then utilize CFD modeling software in combination with existing data from sources including local meteorological reference stations, historical wind models, and traffic count data from public transportation data sources as well as private data sources to develop wind and pollution dynamics models. Modeling can also capture heterogeneous conditions and interpolation of sensor data with gridded data sets.

Informed by the initial modeling of existing conditions, project partners will strategically place a series of PM2.5 air sensors and black carbon instruments throughout Marin City to collect data for an initial period of one year. The anticipated air quality monitors that will be installed include 4 Micro-Weather Stations ($3,000 each for a total of 12K), 20 low cost sensors, such as PurpleAir or equivalent ($300 each for an equivalent of 6k), and 2 black carbon instruments from Aethlabs (model MA350) for providing continuous measurements ($18K each for a total of $36K). This project will also leverage highly accurate and in-kind measurements to gather information to identify local air quality effects and to validate the model. Specifically, Hyphae will utilize their high-quality mobile ultra-fine particle (UFP) sensor (Brechtel ACCESS 9403 Advanced Mixing-based Condensation Particle Counter (aMCPC)) to gather highly accurate measurements of PM2.5, NO, NO2, NOX, BC, and Ozone to understand spatial gradients and validate the CFD model. Project partners will develop a monitoring plan, including deployment, operations, and Quality Assurance Project Plan (QAPP).

**Task 2. Community outreach, engagement, and training**
The Bay Air Center and Hyphae will engage community members on the placement of air sensors based on the CFD model and will train community members on how to take readings, as well as the review, use, and interpretation of air quality data. This will include looking at PM differences within 1-2 miles and interpreting their local PM2.5 data within the fire and smoke map. Hyphae will train community members to operate the mobile UFP sensor. The Bay Air Center will train community members on monitoring indoor air quality (PM2.5, H2S, and VOCs) and work with community members and MCCRHJ to find potential health triggers, including VOCs and to look for mold. The Bay Air Center and MCCRHJ will educate and train community members on air quality impacts and actions community members can take to protect themselves. The Bay Air Center and MCCRHJ will also train community members to conduct a traffic count study based on the methods used by the Bay Area Air Quality Management

District's (BAAQMD) successful study in West Oakland, CA (link) Community members will then be engaged in a charette-style community-participatory design process to inform and develop interventions to protect public health.

**Task 3. Air quality monitoring**
The Bay Air Center will conduct collocation (and training). These PM2.5 air sensors and BC instruments will be collocated to check the quality of the devices and develop any corrections or calibration methods. The collocation will be conducted with the BAAQMD's Sensor Verification System (SVS) - a portable FEM and near FEM reference for PM2.5, BC, NO2, and Ozone. Project partners will deploy the air quality monitors and operate and maintain them for an initial period of 1 year, conduct monthly and quarterly instrument maintenance according to the protocols in the QAPP, and perform regular data reviews. Project partners will conduct a short period of mobile and portable monitoring using higher quality instruments. This would include mobile UFP measurements to determine the spatial extent of traffic pollution. In addition, the portable SVS would be deployed at locations for short periods of times (1-3 hours) to collect PM2.5, NO2, BC, and Ozone. These data and the UFP measurements would also be used to validate the CFD model. The Bay Air Center will conduct annual collocation and assessment with SVS to check the quality (bias and precision) of all devices. In addition, they will provide the community/staff any additional training or refreshers on air monitoring.

**Task 4. In-home assessments for indoor air pollutants and potential health triggers**
Community members will conduct in-home assessments for potential indoor air quality issues from VOCs, PM2.5, and hydrogen sulfide related to sewer gasses. Community members will also look for mold and other health triggers. Project partners will educate community members about actions that can be taken based on any triggers found. For indoor air monitoring, we will use a combination of PurpleAir PA-I air sensors (10 at $300/each for a total of $3000) that will provide continuous estimates of PM2.5 concentrations. In addition, to address VOCs and the potential of sewer gasses, we plan to use one handheld air monitor to do assessment monitoring in and around residences. For this purpose, we will use the Aeroqual 500 Series portable device with an Hydrogen Sulfide (H2S) and total VOCs (TVOC) (1 handheld device for $2,000).

**Task 5. Traffic count study**
Community members will conduct traffic counts to gather additional information about the number of cars and trucks passing Marin City at different times of day to support validation of the CFD model. This study will be developed in partnership with the Bay Air Center.

**Task 6. Data analysis/interpretation and validate CFD model**
Bay Air Center will process the air quality monitoring data to characterize air quality across all of Marin City. Hyphae will incorporate all collected data into the initial CFD model to validate it and prepare for modeling of different interventions to improve air quality and public health. Project partners will complete data analysis and community specific interpretation (ie, what does this data mean for the community, and what actions can be taken based on this information?) and organize community participatory charrette-style design process to present monitoring findings, and discuss the range of possible interventions, discuss pros/cons and possible mult-benefits of different solutions and determine communities preferred interventions. Hyphae will run CFD models to assess AQ mitigation potential of possible interventions (traffic rerouting, sound wall installation and vegeative buffer placement) and present findings back to the community.

Hyphae will also develop conceptual renderings of community preferred interventions for future fundraising and policy work.

**Task 7. Paths forward**
Project partners will develop plans for funding to take monitoring data and community intervention ideas and complete design, permitting, engineering phase; securing funding for planned interventions; and ensure maintenance of monitors and continuation of data collection.

**B. Project Significance**
Marin City is an overburdened, disadvantaged community of over 3,000 that has the highest chronic disease rate in Marin County, including high rates of asthma and respiratory disease as well as cardiovascular morbidity, and the lowest average life expectancy. It is also the only place in Marin County with family-based public housing. Marin's City's geography, often described by community members as a bowl without a spout, is part of a complex meteorological system with likely air quality impacts from multiple sources, including seasonal wildfire smoke, pollutants from past contaminated sites including 3 kerosene stations, 3 dry cleaners, and 2 gas stations, and from the 101 Freeway, which partially circles the community. Marin City scores in the 99th percentile for traffic burden in the California EPA's CalEnviroscreen, which measures burden from multiple sources of pollution. These existing conditions have put the Marin City community at risk of health problems related to air pollution and made them particularly vulnerable to the COVID-19 pandemic.

While there are many likely sources of air quality impacts on Marin City and the bowl-shape of the area could trap pollutants, there is very little information that currently exists about air quality, the sources of existing air pollutants, and how air pollutants move through or aren't able to escape Marin City. This project would address a massive data gap and collect air quality data in Marin City to differentiate between pollution sources and inform the most effective interventions to improve public health by installing a series of air quality monitors around Marin City, informed by CFD modeling of existing data. Additional vital data will be collected by trained community members through in-home assessments for health triggers and traffic counts. The end goal of this project is to have a scientifically-defensible set of data about air quality in Marin City, a suite of informed individual actions that can be taken by community members to reduce exposure, community-preferred interventions, as well as a plan for funding the engineering design and construction of modeled interventions to address the sources of air pollution in Marin City. This project will most immediately benefit the people who live in Marin City, and an additional 2,000 people who live on the surrounding hillside and many more who frequent the shopping center will also positively benefit from enhanced air quality monitoring and interventions.

**Section 2. Community Involvement**
**A. Community Partnerships**
This project will overall tightly couple air quality monitoring with community engagement to analyze and interpret what the air quality data collected means for different community members and the actions that can be taken. MCCRHJ currently has funding from the Bay Area Air Quality Management District to increase community engagement around air quality issues in Marin City. The installation of air quality monitors through this proposed project would dovetail with MCCRHJ's existing work by further informing community education and increasing community engagement in actionable solutions development processes. In particular, additional information

about pollution sources and how air moves through Marin City will support MCCHRJ in providing scientifically defensible information to the community on air quality impacts, as well as informed actions that can be taken by individuals to reduce their exposure. Because there is currently so little data on air quality pollution and movement in Marin City, this effort will also potentially find unknown sources of air quality pollutants and public heath impacts that MCCHRJ can further educate community members about.

As part of this proposed project, community members will be engaged and trained to do in-home assessments, air quality monitoring operation, and data collection and analysis, as well as to conduct traffic counts. Community members will also be engaged in planning for solutions development. Involving community members in the problem-identification and solutions-development processes will create jobs in the community and ensure the inclusion of community insight and expertise.

**MCCRHJ** will conduct community outreach and engagement, and will ensure that air quality issues are connected to public health and other community challenges. MCCRHJ has been a long-time advocate in the Marin City community, and has successfully leveraged grants from DWR, BAAQMD, and others to lead community-driven problem definition and solutions development processes to address inequities in Marin City. MCCRHJ will be responsible for leading or supporting all project activities.

**Play Marin** will serve as MCCRHJ's fiscal sponsor and provide support in their area of expertise, community and youth development, through MCCRHJ's young environmentalist program. Play Marin will be responsible for grant administration and community engagement activities in Tasks 0 and 2.

**BAAQMD/Bay Air Center** (in-kind) brings technical expertise in air quality and monitoring. They will support the development of the air monitoring plan, deployment of monitors, data quality assessment/quality control, analysis, and will train community members to take part in all of these activities, as well as help train on the in-home assessments of indoor air quality issues and actions community members can take to protect themselves from air quality impacts. In addition the Bay Air Center will provide the SVS and assist with activities utilizing the system. The Bay Air Center will support activities in tasks 1 - 7.

**Hyphae** will develop a digital twin model of the community and run CFD modeling to inform placement of the air quality sensor network and will train community members on air quality issues and interventions. Hyphae Design Lab will also present monitoring findings and initial modeled interventions to the community for consideration in community participatory design charettes. Hyphae has worked with many other communities in CA and across the US to model and implement community-based air quality interventions. Hyphae will also provide the high quality UFP mobile sensor. Responsibilities in tasks 1-7.

These relationships already exist and all groups share the goal of improving the lives and health of the Marin City community. MCCRHJ and Play Marin will benefit from the expertise and training from technical partners, including the Bay Air Center and Hyphae on air quality to inform existing community engagement and advocacy on behalf of the Marin City community. Hyphae and the Bay Air Center will benefit from the direct application of monitoring and modeling validation to understand how these tools can best be used together to understand air pollutants and provide the most comprehensive solutions for vulnerable communities. The

community of Marin City will most of all benefit from informed education and outreach, job training and development in the environmental field, and scientifically defensible air quality information and a validated CFD model to inform solutions to air pollution and improve public health. All partners are committed to collecting high-quality air quality data in Marin City and sustaining the sensor network and these partnerships after the grant funding. Part of this grant work will be developing a sustainability plan to ensure this. Next steps will be collaborating on securing funding to design and fund interventions informed by monitoring and modeling.

**B. Community Engagement**

This project has been called for and developed by Marin City community members. MCCRHJ is made up of community members, some of whom have lived in Marin City for over 80 years over 5 generations. Marin City community members have evidenced health impacts from pollution burden, and have expressed desire to monitor their air and gather other information in order to be able to protect themselves and advocate for policy and infrastructure solutions to improve health. Play Marin is also made up of community members and has expertise working with and relationships specifically with challenging youth and young adult males who will be part of the project's target audience. MCCRHJ and Play Marin will, with additional community input (also funded through BAAQMD's James Cary Smith grant program), lead development of a monitoring and modeling plan, with technical support and resources provided by BAAQMD/Hyphae to the support the community in understanding and addressing air quality issues. Most importantly, 10-15 community members will be trained in air quality monitoring, to conduct in-home assessments and traffic accounts, and lead community-participatory design charettes to plan for interventions to improve public health.

**Community-Based Organization Set-Aside** (10 possible points) - See Play Marin annual report MCCRHJ has represented and supported community-led planning engagement and solutions-development processes to address water and air quality issues with the Marin City community through programs such as the Bay Area Integrated Regional Water Management Disadvantaged Community and Tribal Involvement Program (DACTI Program) and BAAQMD's James Cary Smith grant program. Through the DACTI Program, MCCRHJ led a community-based water-related needs assessment with over 250 community members and is currently supporting residents to test their tap water through an ELAP-certified lab to follow-up on extensive concerns about tap water quality identified by community members through the needs assessment. MCCRHJ also developed and runs a successful Young Environmentalists program, engaging and training youth in the environmental field through funding from the San Francisco Bay Restoration Authority. MCCRHJ has partnered with the Marin City Health and Wellness Clinic to conduct a comprehensive health survey with community members to connect environmental issues to public health, and connect community members with a health care provider to develop health care plans. MCCRHJ has led many community-driven project visioning processes to develop Marin City's drainage pond into a multi-benefit flood mitigation, habitat restoration, and community recreation project with Audubon California. MCCRHJ's work is also supported and funded by the Marin Community Foundation. This effort will work in tandem with other efforts led by MCCRHJ to address other cumulative impacts including flooding, and contamination. MCCHRJ is well-positioned to link its ongoing water restoration efforts with this emphasis on a healthier living environment that includes improved air quality (e.g, trees and green infrastructure can mitigate air and water pollution, and provide access to natural beauty). In all of

this work, MCCHRJ encourages public engagement with the necessary data gathering, design of mitigation measures, and advocacy for equitable changes.

**Section 3. Environmental Justice and Underserved Communities**

Marin City is an environmental justice unincorporated area, bound to the administration and decision-making of Marin County rather than having the ability to self-determine and make decisions at a local level. Marin City is under-prioritized by the County compared to wealthier, whiter communities nearby. 35% of the Marin City population identifies as black (compared to 2% of the county as a whole), and 34% of the population speaks a language other than English. Marin City was established as part of the World War II shipbuilding effort, and was one of the only areas in Marin County where African Americans were allowed to live. It is home to the only family public housing in the County, residents of which describe as degraded. This family public housing is located right next to the 101 Fwy, which partially encircles the community and contributes to air and water pollution, including 12 acres of contaminated runoff. Additionally, Marin City is a food desert - there is no grocery store in the community, even though it is the highest density area in Marin County. Residents of Marin City have significantly lower incomes than other areas in Marin County.

According to the California EPA's CalEnviroScreen 4.0, Marin City is in the 99th percentile for exposure from traffic, the 62nd for toxic releases, and 47th for diesel particulate matter. Contamination issues in Marin City are compounded by flooding, lack of a drainage system, and degraded infrastructure, as shown in the 2018 Marin City Drainage Study. In large storm events, the 101 Fwy floods and blocks the only entry and exit into Marin City, sanitary sewers overflow, and community members have been forced to walk through contaminated waters to get home from school. The community is also concerned about air vapors backing up in pipes from contaminated sites that are closed but have not been cleaned. Breathing polluted air contributes to chronic diseases and early death, and Marin City has the highest chronic disease rate in the County and a 17+ year difference in life expectancy compared to wealthier areas of Marin. Due to these existing conditions, Marin City is more vulnerable to respiratory diseases like COVID, as well as additional air quality impacts.

**Section 4- Environmental Results- Outcomes, Outputs, and Performance Measures**

**A. Expected Project Outputs and Outcomes**

*Task 0:* MCCRHJ will provide quarterly progress reports and a final project report to EPA.

*Task 1:* Hyphae will produce an initial CFD model using existing data that will be used to help MCCRHJ and Marin City community members decide where to place different types of air monitors strategically throughout Marin City, and to develop a monitoring plan. The CFD model and monitoring plan with maps and descriptions of the installed air quality network, based on the CFD model, will be provided.

*Task 2:* The Bay Air Center and Hyphae will provide training to 10-15 community members on air quality monitoring, including how to take readings, as well as the review, use, and interpretation of air quality data. Bay Air Center/Hyphae Labs will also train some of these community members to operate the high-quality mobile sensor. The same 10-15 community members will be trained to conduct in-home assessments for air quality health triggers, as well as traffic counts. Bay Air Center and others will educate community members on indoor air quality impacts and actions that can be taken to protect themselves. Community members will be engaged in design process and planning for future solutions alternative analysis. A list of

community meetings, trainings and attendees, and training materials will be provided. Tailored community outreach materials, updated as monitoring data is collected, will be provided.

*Task 3:* A network of air quality sensors will be installed in Marin City. Air quality data will be collected for an initial period of 1 year to develop baseline information about air quality in Marin City to inform advanced air quality monitoring and interventions to protect public health. Raw and analyzed data will be provided.

*Task 4:* Community members will conduct 100+ in-home assessments to monitor for indoor air pollutants and identify other potential health triggers such as mold. MCCRHJ and partners will educate community members about potential immediate actions that can be taken based on any triggers found. Results from the in-home assessments will be reported, as well as a list of immediate actions that community members can take to protect themselves from indoor air risks.

*Task 5:* Community members will conduct a traffic count study, as developed by MCCRHJ, the Bay Air Center, and Hyphae, to gather additional information to help refine and calibrate the CFD model. Traffic count methodology and data will be reported.

*Task 6:* The Bay Air Center will process all air monitoring data. Hyphae will incorporate all collected data into the initial CFD model to validate it. The Bay Air Center/Hyphae will then provide a presentation to community members, educating them on the findings of the data collection and will present several example interventions based on the CFD modeling. The calibrated CFD model with air monitoring and traffic count data incorporated and data analysis, presentation on data collection and modeled example interventions, and notes from the community participatory charette-style process will be provided.

*Task 7:* MCCRHJ will work with the Bay Air Center, Hyphae, and community members to develop a monitor maintenance plan to ensure continuous operation and data collection from the monitors beyond the scope of this grant, and on the application of the collected information to inform solutions to protect public health. Project partners will also plan for designing and funding interventions based on monitoring data, CFD modeling, and community participatory charettes. The plan for sustainability, including planning for advanced air quality monitoring, and the plans for designing (permitting, engineering studies for) and interventions will be provided.

**B. Performance Measures and Plan**

*Task 0:* Completed quarterly progress reports and final project report including data and lessons learned will be sent to the EPA on schedule set collectively by MCCRHJ and EPA. A total of 8 quarterly reports will be submitted and a final report submitted within 120 days of the conclusion of project activities.

*Task 1:* Envimet, a peer reviewed and validated modeling software, will be utilized to conduct CFD modeling, a leading platform utilized by microclimate researchers. Openfoam, another CFD tool will be utilized for validating and comparing data. Models will also be validated Similar methods have been utilized for FHWA, and NIH funded projects. The models will also be cross validated after actual measurements. Baseline CFD models will be built with high resolution lidar data, meteorological data. Over 4 different meteorological data measurements and models will be aggregated and utilized to build the CFD model. Both publicly available, low resolution traffic counts, as well as high resolution traffic predictions(from private, aggregated cell phone data) will be used to create the traffic inventories in the CFD modeling environment. The

complete methodology and underlying reference academic papers and studues will be shared and reported on in the first progress report. The monitoring plan, which will guide the installation of air quality monitors around Marin City, will be developed following QA/QC practices described in detail in the QA/QC section and reported to the EPA in the first progress report.

*Task 2:* At least 5 trainings provided by Bay Air Center and Hyphae; at least 5 community meetings and community-participatory charettes with at least 200 community participants total. A pre/post survey with 10-15 trained community members will be conducted to measure knowledge levels, advocacy, and participation. Fliers with air quality and monitoring information and ways to get involved in the community participatory design charettes will be handed out door-to-door to at least 500 community members. A survey will also be conducted with community members who participate in in-home assessments and community-design charettes to measure knowledge and participation increases.

*Task 3*: Air quality monitoring will be conducted for at least one year. The Bay Air Center developed the portable Sensor Verification System (SVS) to help community members perform air monitoring and sensor validation. The PM2.5 air sensors will need to meet the performance targets established by EPA for PM2.5 air sensors (discussed in the QA section of this proposal). The air quality monitoring network will be operational at least 85% of the time to ensure a complete and representative data set.

*Task 4*: MCCRHJ will conduct at least 100 in-home assessments for potential health triggers through trained community members. Follow up will be provided as-needed to each in-home assessment participant. Results from these assessments will be reported to the EPA in reports.

*Task 5:* 10-15 community members will be trained to conduct traffic counts. Traffic counts will be conducted at least 10 times to provide relevant data to validate the CFD model. Data will be reported in the final report.

*Task 6:* Hyphae will validate the CFD model with data collected by community members through in-home assessments, air monitors, and traffic counts. The model will be validated once it can reproduce the conditions identified through the project activities. Project partners will analyze and interpret data and what it means for different community members and will report findings and initial modeled interventions to community members. Hyphae will give at least 3 presentations with community members on data analysis, the validated model, and modeled potential interventions.

*Task 7:* Maintenance plan will be developed to keep monitors in continuous operation after the scope of this grant. Sustainability plan will be developed with plans for completing the design, permitting, and engineering phase of and securing funding for at least 1 planned intervention.

**C. Timeline and Milestones**

*Task 0:* Month 1 - 24
Milestones: Quarterly progress reports and final report.

*Task 1:* Months 1-3
Milestones: CFD model developed and shared with EPA.

*Task 2:* Months 1 - 24
Milestones: 10-15 community members trained; at least 200 community members involved; 5 community meetings and participatory design charettes held.

*Task 3:* Months 4 - 16 (1 year)
Milestones: Air quality monitoring data collected and validated for at least 1 year.

*Task 4:* Months 4 - 16
Milestones: 100 in-home assessments for health triggers completed by community members.

*Task 5*: Months 4 - 16
Milestones: 80 traffic counts completed that characterize different types of traffic and vehicles.

*Task 6:* Months 2-24
Milestones: Ongoing data analysis, interpretation, and final calibrated model. At least 2 initial modeled interventions to present to community in design charettes. List of community participatory design ideas.

*Task 7:* Months 15-24
Milestones: Maintenance plan. Final round of intervention models informed by community participatory planning process. Plan for funding for permitting and engineering phase and plan for securing funding for planned interventions.

**Section 5- See attached Quality Assurance Statement**

**Section 6- Programmatic Capability and Past Performance**

**A. Past Performance (5 possible points)**

- (2017-2022) Disadvantaged Community and Tribal Involvement Program grant award of $200,000 from the CA Department of Water Resources, administered by the San Francisco Estuary Partnership through the Integrated Regional Water Management Program.
- (2021-2022) Grant funding from Marin Community Foundation (MCF)'s Buck Family Fund for $175,000.
- (2021-2022) Grant funding from the San Francisco Bay Restoration Authority (SFBRA)'s Community Grants Program for $100,000 for youth leadership development services.
- (2022-2023) James Cary Smith grant program award of $100,000 from the Bay Area Air Quality Management District. Award agreement is signed, workplan will begin May 2022.

Hyphae has over 10 years experience in supported local community based nonprofits as well as academics and NGO's in West Oakland, Dallas, Louisville, Richmond CA in writing and managed grants from BAAQMD($150,000), Governor's Office of Research and Planning ($250,000), Alameda Transportation Commission($900,000), California Natural Resource Agency ($950,000), Texas Trees Foundation ($500,000), National Science Foundation ($250,000) NIEHS ($4m), and The Nature Conservancy ($8m).

**B. Reporting Requirements**

DACTIP: Reported progress toward expected outputs adequately and on time and delivered all expected outcomes, including substantial community engagement and events, as well as surveys, collated data from, and final report on a needs assessment process that engaged over 280 community members. Conducted over 40 tap water quality tests in community members' homes.

MCF and SFBRA grants are still in progress. To date, all work as been completed on time.

**C. Staff Expertise -** See attached for key staff resumes and expertise.

**Marin City Climate Resilience and Health Justice** is made up of residents advocating for the community of Marin City. Key staff have over 50 years of experience in community outreach and engagement, conducting needs assessments, and job development in education, community health, and environmental services Marin City.

**Bay Air Center** provides technical assistance, support, and training through the Bay Area Air Quality Management District. Key staff bring over 30 years of experience creating innovative programs for air quality applications, specializing in collecting and analyzing data using low- and mid-cost air sensors to provide insights about the air we breathe.

**Hyphae** is a national leader in researching and implementing solutions to near road pollution. They have received grants directly and in partnership with community and academics to develop both predictive modeling as well as physical installation of interventions and their measurement. They are leading the greening intervention of the first and largest clinical trial to improve air quality at a neighborhood scale in Louisville Kentucky.

**Section 7- Budget**

The proposed EPA grant request is $499,828, with a total project budget of $659,828. Air Quality Outreach Workers will be community members who are trained to conduct in-home assessments, air quality monitoring measurements and interpretations, and traffic surveys. The Director and Community Outreach and Engagement Coordinator will oversee all activities and manage coordination with partners and community members. Equipment costs include tax and shipping and will be ordered in close coordination with the Bay Air Center. Hyphae will be contracted to provide community training and modeling services, which will inform monitoring strategy. Play Marin will serve as fiscal sponsor for MCCRHJ. Community-led design of potential solutions will be conducted at several community events and stipends will be given to community members for their participation and leadership in these events.

MCCRHJ will receive in-kind training support and Sensor Verification Systems (SVS) from the Bay Air Center. In-kind support will be equivalent value to $160,000. The Bay Air Center has committed its support through funding from the Bay Area Air Quality Management District.

| Line Item & Itemized Cost | EPA Funding |
|---|---|
| **Personnel** | |
| Director @ $100/hr x 600 hrs | $60,000 |
| Community Outreach and Engagement Coordinator @ $40/hr x 1500 hrs | $60,000 |
| 5 Air Quality Outreach Workers @ $25/hr x 200 hrs | $50,000 |
| 5 Air Quality Outreach Workers @ $18/hr x 166 hrs | $29,980 |
| TOTAL PERSONNEL | $199,980 |
| **Fringe Benefits** | |
| 18% Fringe Benefits of Salary and Wages @ 18% x Total Personnel - Retirement, Health Benefits, FICA, SUI | **$35,996** |

| | |
|---|---|
| TOTAL FRINGE BENEFITS | $35,996 |
| **Equipment** | |
| 20 PurpleAir PA-II (Outdoor) @ $283.86 | $5,677 |
| 10 PurpleAir PA-I (Indoor) @ $226.86 | $2,269 |
| 1 Handheld sensor for sewer gas detection Aeroqual Series 500 Monitor (with H2S and TVOC sensors) | $2,099 |
| 10 WiFi Hotspots & Service @ $330.60 | $3,306 |
| 4 Community Weather Stations & Mounting Hardware @ $3,300 | $13,200 |
| Maintenance/Repair Fee | $2,646 |
| 2 Black Carbon Instruments @ $18,837.50 | $37,675 |
| 2 Installation Hardware @ $2,200 | $4,400 |
| TOTAL EQUIPMENT | $71,272 |
| **Supplies** | |
| Office Supplies and Printing | $2,000 |
| TOTAL SUPPLIES | $2,000 |
| **Contractual** | |
| Hyphae Design Labs | $124,580 |
| Play Marin Fiscal Sponsor Fee | $45,000 |
| TOTAL CONTRACTUAL | $169,580 |
| **Other** | |
| Community Participation Stipends | $10,000 |
| Community Events | $11,000 |
| TOTAL OTHER | $21,000 |
| TOTAL FUNDING | $499,828 |
| TOTAL PROJECT COST (INCL. IN-KIND SUPPORT) | $659,828 |

## Expenditure of Awarded Funds

This project is an urgent need for Marin City. MCCRHJ has already established the necessary partnerships for this work as evidenced by the partnership letters attached from The Bay Air Center and Hyphae. MCCRHJ also has an established network of community members ready to be trained to serve as Air Quality Outreach Workers as soon as funding is awarded. MCCRHJ will develop contracts of work with Hyphae and with each of its Air Quality Outreach Workers. The ordering of equipment will be supported with the Bay Air Center's expertise and monitors will be installed efficiently and appropriately with their training. The schedule, budget, and scope were developed in close partnership with the Bay Air Center and Hyphae. This will ensure tight adherence to stated budget and timeline.

The Buck Family Fund of MCF

March 25, 2022

Dear Grant Review Committee:

RE: EPA Enhanced Air Quality Monitoring for Communities grant application

I am pleased to provide this letter of support to the Marin City Climate & Health Justice's application to the EPA Enhanced Air Quality Monitoring for Communities grant program. For several years, the Buck Family Fund of MCF has provided support for MCCHJ's leadership and advocacy for addressing environmental justice issues in Marin City.

We are excited at the prospect of MCCHJ collecting quantitative data to inform local advocacy and planning efforts to reduce exposure to airborne contaminants. We look forward to learning from the experience to be gained from this endeavor.

Sincerely,

Patti D'Angelo Juachon
Director for the Environment

# Please wait...

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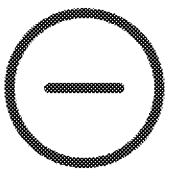
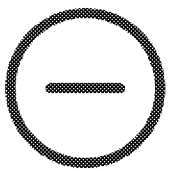
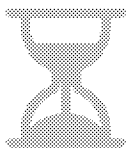
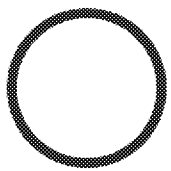
For more assistance with Adobe Reader visit http://www.adobe.com/go/acrreader.

Company Name **Marin Play**

DUNS Unique Entity ID **113073703**

|  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|
| **Core Data** Completed | **Assertions** Not Required | **Reps & Certs** Not Required | **POCs** Completed | **Submit** Completed | **Processing** In Progress | **Active** Not Complete |

The quality assurance and quality control approach will involve a QA/QC lead for the project and QA/QC practices to ensure complete, timely, and accurate data collection for all air quality instruments. Our team is familiar with quality assurance project plans (QAPP) and will develop a QAPP before the award of an assistance agreement.

Responsibility for quality will use a combination of trained members from the community and experts from the BAAQMD's Bay Air Center. Staff at the Bay Air Center, Tim Dye of TD Environmental and Dave Bush of T&B systems have over 60 years of air monitoring experience and have developed QA procedures, QAPPs, and QA guidance for air quality and meteorological monitoring for the U.S. EPA, state/local air quality agencies, and NGOs.

Our general approach for conducting quality assurance includes the following activities:

- Selecting a quality sensor, PurpleAir, that has received favorable evaluations from many organizations, including AQSpec, and is used by the U.S. EPA in its Fire and Smoke map.
- Meeting EPA's new performance targets for PM2.5 air sensors for non-regulatory supplemental and informational monitoring (NSIM) applications.
- Collocating all sensors at the beginning of the study and comparing them to nearby reference measurements (PM2.5 and BC)
- Applying data correction algorithms for the PM2.5 sensor data using the EPA data correction algorithm.
- Conducting maintenance on a monthly and annual based to check the integrity of each sensor.
- Conducting daily and monthly data reviews of the data to detect any problems early and take appropriate action.
- Using Standard Operating Procedures (SOPs) for routine tasks allows trained community members to maintain the equipment.

We will compare the outdoor sensors with the BAAQMD's new Sensor Verification System (SVS). We will collocate PM2.5 sensors and BC instruments at the beginning of the study and then collocate annually to check the network's performance. The portable SVS allows for checking the performance of sensors relative to reference (or near reference) instruments. The SVS is self-contained, portable, and easy to transport/set up by community groups. The SVS's FEM and near-reference instruments provide the performance needed to validate a wide range of air sensors fully. It can be set up within minutes and measures Ozone (FEM), NO2 (FEM), PM2.5, black carbon, and meteorology.

Data quality objectives for the measurements includes:

$PM_{2.5}$ - $PM_{2.5}$ sampling will be measured using PurpleAir sensors. It contains a Plantower air sensor component widely used and characterized by many organizations, including the AQ-SPEC program. The data quality objectives are based on EPA's performance target for PM2.5 sensors:

- Bias Slope of $1.0 \pm 0.35$ and an Intercept (b) of $-5 \leq b \leq 5$ μg/m3
- Linearity Coefficient of Determination (R2) of greater than 0.70
- Normalized Root Mean Square Error (NRMSE) less than 30%
- Data completeness greater than 90%

Black Carbon (BC) - The microAeth® MA350 is a real-time 5-wavelength UV-VIS-IR Black Carbon monitor housed in an outdoor-rated case with an 85-sampling location automatic filter tape advance system for 3-12 months of continuous measurements. The EPA has not designated a FEM for the real-time collection of BC. Currently, no method exists for directly calibrating an aethalometer or establishing a certified standard. To ensure high-quality data, we will conduct a sampler flow check (± 10% of design) and a zero-check using HEPA filter (0 ± 0.1 µg/m3) every quarter. Annual, we will send the MA350 to the manufacturer for an instrument check-up. Data completeness criteria will be greater than 90%.

Timothy S. Dye, CCM
*President and Owner*

TD ENVIRONMENTAL SERVICES
*Air quality sensing, analytics, and insights*

## Profile

Tim Dye is a visionary and entrepreneur with over 30 years of experience creating innovative programs for air quality applications. In 2017, Tim founded TD Environmental Services (TDE), which specializes in collecting and analyzing data using low- and mid-cost air sensors to provide insights about the air we breathe. At TDE, he combines novel technologies and sound science to work on practical and cutting-edge air quality applications. He is a widely recognized leader in air quality sensor technologies for environmental applications and respected as an independent voice in the air sensor community. A visionary and an entrepreneur, he has created many operational air quality programs that provide custom and routine air quality services.

Before founding TDE, Tim held a number of executive and management positions at Sonoma Technology, where he led teams to develop creative, custom programs focused on air sensors, data management systems (AirNow.gov), data analysis, and public education. At TDE, Tim uses his creativity and deep experience to empower organizations to use air sensors to collect high-quality data for a range of applications. His knowledge of the air sensors ecosystem, companies, and experts worldwide allows him to create the best solutions for his clients, including foundations, community groups, private companies, and government organizations.

## Air Sensors

Mr. Dye is a widely recognized leader in air sensor and Internet of Things (IoT) technologies for environmental applications. For ten years, he has led a broad range of efforts to evaluate and test air sensors to understand how organizations could most effectively employ this new and rapidly changing technology. Mr. Dye built air quality sensing systems for fixed and mobile applications, wrote the U.S. EPA's guidebook on air quality sensors, conducted studies to evaluate and quantify sensor performance, and developed analytics to create information from sensor data. For example, Tim guided the World Resource Institute staff in São Paulo, Brazil, through all aspects of using low-cost air sensors to address pollution from transportation sources. In India, Tim worked with the Shakti Foundation to guide their efforts to install 250 air sensors across the country. Both of these capacity-building projects cover all aspects of using sensors, including setting objectives, developing data quality objectives, selecting and deploying sensors, managing and analyzing data, and more. While completing many air monitoring studies, he has addressed a range of air quality challenges with low-cost sensors: residential wood smoke, wildfire smoke, agricultural dust, and coal dust. Community groups, government, industry, and companies worldwide seek Tim's experience and strategic insights on air quality sensing.

## Training and Education

Tim has a long history of developing innovative products and services. Examples include an infographic, "4 questions to ask when buying an air quality sensor" and SmogCity2, an online game that simulates the cause-and-effect relationships between air quality and weather, emissions, and population. He is currently developing AirActions, an educational program that uses new technologies (including air sensors) to educate students and take actions to improve air quality.

## Data Management and Analysis

For over two decades, Tim has specialized in designing and developing powerful information systems for air quality applications and public communication. He is an internationally recognized leader in developing air quality information systems like the **EPA's AirNow program**. Currently, Tim is leading an effort to create a data management system to ingest, process, and display air quality sensors data for the City of Denver and other clients to provide real-time air quality information to schools and decision-makers.

## Education and Certifications

MS, Meteorology, Pennsylvania State University
BS, Meteorology, Millersville University of Pennsylvania

Certified Consulting Meteorologist (#619)

BAY AREA
AIR QUALITY
MANAGEMENT
DISTRICT



March 23, 2022

Terrie Green
Executive Director
Marin City Climate Resilience and Health Justice
630 Drake Avenue
Marin City, CA 94965

**RE: Letter of Support for EPA Enhanced Air Quality Monitoring for Communities Grant**

Dear Ms. Green:

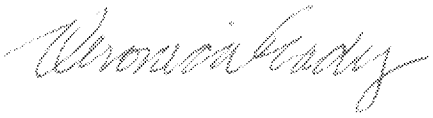
The Bay Area Air Quality Management District (Air District) would like to express its support for Marin City Climate Resilience and Health Justice's community project in Marin City, Marin County.

The Air District values the work of Marin City Climate Resilience and Health Justice to address environmental injustice and air pollution along the Highway-101 corridor in Marin City, an unincorporated community in Marin County. The EPA grant would allow the organization to collect ambient air quality data on within the community and use the data to inform community members about health impacts, strengthen advocacy efforts, and inform mitigation strategies to reduce pollution exposure.

We anticipate continued collaborations with Marin City Climate Resilience and Health Justice and its neighborhood allies as the organization engages with and empowers communities historically impacted by cumulative disproportionate health burdens. Should Marin City Climate Resilience and Health Justice receive funding, the Air District is committed to supporting implementation of the project through technical support provided by the Bay Air Center. The extent of technical support will be scoped to match the requests from community project leads and will be dependent on available resources. Technical support may include assistance in sensor network planning and deployment, technical trainings and capacity building, community specific data analysis, as well as sensor network quality assurance support and field support.

We look forward to partnering with you to improve air quality in the Bay Area, and to working toward health equity for all Bay Area residents.

Sincerely,



Veronica Eady
Senior Deputy Executive Officer of Policy & Equity
Bay Area Air Quality Management District

Cc: BAAQMD Environmental Justice & Community Engagement Officer Suma Peesapati
BAAQMD Meteorology and Measurements Director Ranyee Chiang

# Terrie Green

**Ex. 6 Personal Privacy (PP)**

Goal-directed, results-oriented professional with a strong Community, Human & Social Development, SLR/Climate Change, Environmental Justice and development background. Skilled communicator, persuasive and adaptable. Multi-faceted in the field of Administration, Health & Human Servicing, Community building, vast experience in program planning, contract negotiation, personnel management, and family development. Possess excellent interpersonal, analytical and organizational skills.

## SKILLS AND EXPERIENCE

### COMMUNITY OUTREACH AND ENGAGEMENT

- Created, administrated, and advocated for culturally, environmentally, and community appropriate outreach and engagement services for the residents of Marin City.
- Developed and implemented specialized programs for high stressed individuals, ie parenting, mental health, substance abuse, grief counseling
- Researched and developed brokerage services for special needs clients.

### PROGRAM DEVELOPMENT

- Founded and developed environmental justice programs and services, community-wide disaster preparedness planning, water assessment and testing programs, health education and promotion, parent training/family development.
- Co-developed highly visible and well-respected Health & Wellness Clinic for the Marin City and Southern Marin community.
- Initiated and supervised programs for nursing students from local colleges and universities.
- Created a comprehensive evaluation process to maintain high quality health programs and increase participation and revenue.
- Developed and implemented parenting education and family engagement activities for high-risk families.

### NON-PROFIT MANAGEMENT

- Provided leadership for a $300,000-$600,000 multi-site operational program.
- Managed operations, budget, and audit & compliance.
- Trained, supervised, evaluated, and managed staff of up to 30 employees.
- Extensive experience in proposal and strategic planning.
- Developed and implemented mentoring program for at-risk youth.
- Developed and implemented Education/Vocational and career development program for at-risk academic and whole life success program
- Developed and implemented local, national, international college study tours.
- Identified and analyzed revenue sources for specialized programs: environmental, SLR/Climate Change, flooding, contamination prevention and intervention programs, college & career vocational services, elementary & secondary youth development, youth employment & training, parent education, GED preparation, public health crisis prevention and intervention.

## EMPLOYMENT HISTORY

**Founder – Executive Director-Marin City Climate Resilience and Health Justice (formerly Shore Up Marin City 2012-Present**

**Co-Founder Marin City Health and Wellness Center, Marin City, CA**

Community-Wide Outreach Director & Case Manager 2003-2013

Construction and Development Director 2000-2002
**Department of Community Mental Health, County of Marin, CA**
Social Worker II 2000-2004
**Step II Educational/Vocational Program, Marin City, CA**
Founder/Executive Director 1983-2000

## COMMUNITY DEVELOPMENT

### COMMUNITY BOARDS

Marin County Flood Zone 3 Board – Southern Marin
Marin City Community Services District Board
Cornerstone Community Church - Board

## EDUCATION

B.A. Political Science/Urban Studies May 1971
San Francisco State University

Community Health Worker Certificate May 2010
City College of San Francisco

Additional Coursework in Public Administration, Organizational Development, Educational Psychology, Nutrition ED.

**References available upon request**

## Roberts, Timothy-P

**From:** AirMonitoring
**Sent:** Thursday, April 21, 2022 10:07 AM
**To:** Madeline Duda; AirMonitoring
**Cc:** Ryan Hirano; Terrie Green; Thompson, Ashley; Dowdell, Edward (Ned); tim; Mocka, Corey; James Muller
**Subject:** RE: Enhanced Air Quality Monitoring for Communities (Ref# EPA-OAR-OAQPS-22-01) application

Maddie – I want to let you know that we have reconsidered and accepted your request to submit your application outside of Grants.gov because you sent your full
application to us prior to the 3/25/22 deadline. Additionally, your application meets the threshold eligibility requirements in Section III.C. of the RFA, and will be evaluated against the ranking criteria in Section V. of the RFA. At this time, we anticipate notifying applicants of selection by September 2022.

Please let us know if you would still like to schedule a debriefing. Thank you.

Tim Roberts
Acting Team Leader/JRO
Acquisition Policy Team
OAR, Office of Program Management Operations
U.S. Environmental Protection Agency
202-564-6004
roberts.timothy-p@epa.gov

**From:** Madeline Duda <mduda@lotuswater.com>
**Sent:** Thursday, April 14, 2022 2:05 PM
**To:** AirMonitoring <AirMonitoring@epa.gov>
**Cc:** Ryan Hirano <RHirano@woodardcurran.com>; Terrie Green <terriegreen@marincityclimateresilience.org>; Thompson, Ashley <Thompson.Ashley.M@epa.gov>; Dowdell, Edward (Ned) <Dowdell.Ned@epa.gov>; tim <tim@tdenviro.com>; Mocka, Corey <mocka.corey@epa.gov>; James Muller <james.muller@sfestuary.org>
**Subject:** Re: Enhanced Air Quality Monitoring for Communities (Ref# EPA-OAR-OAQPS-22-01) application

Hi Tim,

Thank you for your response. I understand how for administrative purposes anything of this nature could fall into the clause you mentioned. We hoped that due to notifications on grants.gov that made the process to understand what was needed to properly register very confusing for first-time users (specifically, the note that said you may continue to use your DUNS number in the EIN field), an exception would be allowed. One of the grants.gov representatives that we spoke with said that some applications can be accepted so long as your Sam.gov EIN status is submitted/pending.

I understand that the federal grant application process is set up such that it is the user's responsibility to ensure that they fully understand what is needed in order to apply, though we would love to discuss and support ways of making the process of funding projects to address historic inequities more digestible and accessible for those with fewer resources and/or less experience than those well-resourced groups who have often received funding. The process of even applying for funding to address urgent equity and health issues is time-consuming and effortful to understand and undertake. In general, it is often the case that programs like this - meant to benefit those communities with the most need for it - are in many ways very difficult to access or inaccessible to exactly those groups. Grants.gov and Sam.gov were not easy to untangle for a group of us who have applied - successfully - to several regional and state agency funding programs in California to support several disadvantaged community-based partners around the Bay; it took 3 calls to both grants.gov

and sam.gov to receive an answer about why we were running into the trouble with registering that we were. Unfortunately, this was the first registration process we worked on that would take longer than two full days to complete. For frontline community groups who bear the brunt of pollution burden and other effects of systemic disinvestment, the same resources that agencies have are often not available, and projects are thus often begun outside of the communities they are meant to benefit. Though often well intentioned, these projects can miss the mark because they do not begin both problem-definition and solutions development processes with impacted communities.

For many community-based groups we work with in underserved and historically marginalized areas, one the greatest capacity building needs expressed is support for putting together grant applications to get the necessary funding to address structural inequities because the process can seem - and sometimes can turn out to be - impenetrable if you do not have a full-time grant person on staff or someone who is knowledgeable about such processes, including that a sam.gov EIN can take several business days, and up to two weeks, to receive.

We'd welcome the opportunity to debrief with you about this specific application, and in general to learn more about the EPA's work to make funding more accessible to community-based groups, and anything we can do to support these processes.

Please let us know what days and times would work best for you.

Kindly,

Maddie

Get Outlook for iOS

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**From:** AirMonitoring <AirMonitoring@epa.gov>
**Sent:** Friday, April 8, 2022 10:36:16 AM
**To:** Madeline Duda <mduda@lotuswater.com>; AirMonitoring <AirMonitoring@epa.gov>
**Cc:** Ryan Hirano <RHirano@woodardcurran.com>; James Muller <james.muller@sfestuary.org>; Terrie Green <terriegreen@marincityclimateresilience.org>; Thompson, Ashley <Thompson.Ashley.M@epa.gov>; Dowdell, Edward (Ned) <Dowdell.Ned@epa.gov>; tim <tim@tdenviro.com>; Mocka, Corey <mocka.corey@epa.gov>
**Subject:** RE: Enhanced Air Quality Monitoring for Communities (Ref# EPA-OAR-OAQPS-22-01) application

Maddie – Your application package was determined to be ineligible for award consideration because as noted on pages 15 and 28 of the RFA, "Failure of an applicant to submit timely because they did not properly or timely register in SAM.gov or Grants.gov is not an acceptable reason to justify acceptance of a late submittal."

You may obtain a more detailed debriefing of the basis for our decision that your application package was deemed ineligible for award within 15 calendar days of the date you receive this email. Upon receipt of a timely debriefing request, I will contact you to schedule a debriefing at a mutually agreeable time.

For further information about the debriefing process and your dispute rights with respect to competition-related issues under the subject announcement, please refer to Section VI.D. of the announcement. If you have any questions about the debriefing or disputes process, you may contact me.

We appreciate the effort that went into the preparation of your application package and look forward to your participation in future competitions.

Tim Roberts
Acting Team Leader/JRO

Acquisition Policy Team
OAR, Office of Program Management Operations
U.S. Environmental Protection Agency
202-564-6004
roberts.timothy-p@epa.gov

**From:** Madeline Duda <mduda@lotuswater.com>
**Sent:** Tuesday, March 29, 2022 2:03 PM
**To:** AirMonitoring <AirMonitoring@epa.gov>
**Cc:** Ryan Hirano <RHirano@woodardcurran.com>; James Muller <james.muller@sfestuary.org>; Terrie Green <terriegreen@marincityclimateresilience.org>; Thompson, Ashley <Thompson.Ashley.M@epa.gov>; Dowdell, Edward (Ned) <Dowdell.Ned@epa.gov>; tim <tim@tdenviro.com>
**Subject:** RE: Enhanced Air Quality Monitoring for Communities (Ref# EPA-OAR-OAQPS-22-01) application

Hi Tim,

Thank you very much for both of your responses.

One ticket number for grants.gov that we were given: 427481 (we called several times and spoke to a few different folks, please let us know if multiple numbers are needed for a decision). The information associated with this ticket is Paul Austin with Play Marin, and my phone number (540) 435-2767.

Two ticket numbers from Sam.gov/GSA Federal:
INC-GSAFSD5893719
INC-GSAFSD5893489

Should I attach the entire application package in one document in PDF format, or are the PDF documents provided in the previous email sufficient?

I'm also attaching photos from Friday of the screens that caused the most heartache, "Please enter SAM's new UEI in the UEI field. You may also continue to enter DUNS." As well as "Starting April 4, 2022, the UEI (SAM) will be the unique entity identifier for federal funding opportunities." As a small community-based organization without federal grant application experience, we understood this to mean that using the DUNS number, which they have, was acceptable until April 4. When we worked to create a profile to submit the application on Grants.gov on Thursday afternoon and the error we were getting was "UEI not recognized", we assumed there was an issue with the DUNS so hunted down DUNS threads. On our third call to Grants.gov on Friday, someone told us that to use the DUNS, you still need to have a UEI, and that is when we got in touch with EPA Region 9 and submitted for a UEI on Sams.gov. We'd registered an account but didn't know that a UEI was needed before April 4.

Thank you very much again for your consideration.

Best,

Maddie

**From:** AirMonitoring <AirMonitoring@epa.gov>
**Sent:** Tuesday, March 29, 2022 6:14 AM
**To:** Madeline Duda <mduda@lotuswater.com>; AirMonitoring <AirMonitoring@epa.gov>
**Cc:** Ryan Hirano <RHirano@woodardcurran.com>; James Muller <james.muller@sfestuary.org>; Terrie Green <terriegreen@marincityclimateresilience.org>; Thompson, Ashley <Thompson.Ashley.M@epa.gov>; Dowdell, Edward

(Ned) <Dowdell.Ned@epa.gov>
**Subject:** RE: Enhanced Air Quality Monitoring for Communities (Ref# EPA-OAR-OAQPS-22-01) application

Maddie – I realized I replied to your earlier email before seeing this one. As noted in my earlier email, please provide us with your Grants.gov case number(s).

We will notify you soon as to whether we will accept your application being submitted outside of Grants.gov, consistent with Appendix A of the RFA.

Tim Roberts
Acting Team Leader/JRO
Acquisition Policy Team
OAR, Office of Program Management Operations
U.S. Environmental Protection Agency
202-564-6004
roberts.timothy-p@epa.gov

---

**From:** Madeline Duda <mduda@lotuswater.com>
**Sent:** Friday, March 25, 2022 11:59 PM
**To:** AirMonitoring <AirMonitoring@epa.gov>
**Cc:** Ryan Hirano <RHirano@woodardcurran.com>; James Muller <james.muller@sfestuary.org>; Terrie Green <terriegreen@marincityclimateresilience.org>
**Subject:** RE: Enhanced Air Quality Monitoring for Communities (Ref# EPA-OAR-OAQPS-22-01) application

Hi again Tim,

We spoke to several people at EPA Region 9 today and hope that we are still able to submit an application for enhanced air quality monitoring in Marin City on behalf of Play Marin and Marin City Climate Resilience and Health Justice. EPA Region 9 and Grants.gov staff encouraged us to send all application materials to you before the deadline in case this project is able to be considered due to the conflicting information on Grants.gov that says DUNS numbers can still be used in the EID field until April 4. I am also attaching a screenshot of Play Marin's (Marin Play) status as submitted and processing in SAM.gov.

To this email I am attaching:

- The 12-page project narrative
- Section 5: Quality Assurance Statement
- Resumes and qualifications from key staff, including:
    - Ms. Terrie Green, Marin City Climate Resilience and Health Justice
    - Tim Dye, Bay Air Center
    - Hyphae Design Labs staff, led by Brett Bucknum
- A letter of support from the Marin Community Foundation
- A letter of support from the Bay Area Air Quality Management District
- An annual report and one-pager on Play Marin for the community-based organization set-aside requirement
- The four required EPA forms

Thank you very much for your consideration of this important project we are submitting on behalf of our community partners Play Marin and Marin City Climate Resilience and Health Justice.

Very best,

Maddie

**From:** Madeline Duda
**Sent:** Friday, March 25, 2022 3:20 PM
**To:** airmonitoring@epa.gov
**Cc:** Ryan Hirano <RHirano@woodardcurran.com>; James Muller <james.muller@sfestuary.org>; Terrie Green <terriegreen@marincityclimateresilience.org>
**Subject:** Urgent! Help with ensuring a disadvantaged, overburdened community group can apply for needed air quality funding today

Hi Tim Roberts,

I was given your email by the EPA Region 9 office.

I'm working with a community group to submit a proposal for Enhanced Air Quality Monitoring in Communities, and we've been working to ensure that they're able to actually apply for this opportunity to collect very needed air quality data to inform action to address massively disproportionate health impacts. They have a DUNS number, and the Grants.gov website says you can use EIN or DUNS. However, when we actually went to try to submit the application in Grants.gov, it told us the DUNS number was not found. I called Grants.gov and was ping-ponged back and forth with SAM.gov several times until I was told that to use the DUNS number you actually have to have an EIN. We had thought that the EIN requirement was going into effect after this grant deadline (today, March 25), on April 4. We talked again to someone at Grants.gov and submitted a request for an EIN through SAM.gov, but they said that process might take 2 business days, which would render the group ineligible for this opportunity. They said that for some grants so long as you can show that your group is in submitted status for a SAM EIN, you can still apply. We are really hoping that is the case here. EPA Region 9 Office recommended that I email you with a time-stamp to record our efforts and barriers to applying.

If we don't hear back from you before the deadline, we will attach all application materials here in an attempt to secure extremely needed funding and data for a community vulnerable to disproportionate health impacts. We have been working with the Bay Area Air Quality Management District's Bay Air Center and an air quality intervention modeling and design firm to put together a proposal for direct action. It would be such a shame if this community group's application was not able to be reviewed and submitted due to technological barriers.

Please let us know what is possible.

Very best,

Maddie

**Maddie Duda** (she/her)
Community Involvement Planner

**Lotus Water**
660 Mission Street, 2nd Floor, San Francisco, CA 94105
650.796.5455 | www.lotuswater.com

*Lotus Water supports + celebrates all our differences*

Join Our Team!

# EPA KEY CONTACTS FORM

OMB Control No. 2030-0020
Approval expires 06/30/2024



**Authorized Representative:** *Original awards and amendments will be sent to this individual for review and acceptance, unless otherwise indicated.*

**Name:** Prefix: Ms First Name: Terrie Middle Name:
Last Name: Green Suffix:

**Title:** Executive Director

**Complete Address:**

Street1: 630 Drake Avenue
Street2:
City: Marin City State: CA
Zip / Postal Code: 94965 Country: United States

**Phone Number:** 415-336-6421 **Fax Number:**

**E-mail Address:** terriegreen@marincityclimateresilience.org

**Payee:** *Individual authorized to accept payments.*

**Name:** Prefix: First Name: Paul Middle Name:
Last Name: Austin Suffix:

**Title:** Executive Director

**Complete Address:**

Street1: 20 Pacheco Street
Street2:
City: Marin City State: CA
Zip / Postal Code: 94965 Country: United States

**Phone Number:** 415-686-5045 **Fax Number:**

**E-mail Address:** paustin@playmarin.org

# EPA KEY CONTACTS FORM

**Administrative Contact:** *Individual from Sponsored Programs Office to contact concerning administrative matters (i.e., indirect cost rate computation, rebudgeting requests etc).*

| | | | | | |
|---|---|---|---|---|---|
| **Name:** | **Prefix:** | | **First Name:** | Cerella | **Middle Name:** |
| | **Last Name:** | Hampton | | | **Suffix:** |
| **Title:** | Chief Administrator | | | | |
| **Complete Address:** | | | | | |
| **Street1:** | 20 Pacheco Street | | | | |
| **Street2:** | | | | | |
| **City:** | Marin City | | **State:** | CA | |
| **Zip / Postal Code:** | 94965 | | **Country:** | United States | |
| **Phone Number:** | 281-964-8143 | | **Fax Number:** | | |
| **E-mail Address:** | info@playmarin.org | | | | |

**Project Manager:** *Individual responsible for the technical completion of the proposed work.*

| | | | | | |
|---|---|---|---|---|---|
| **Name:** | **Prefix:** | | **First Name:** | Terrie | **Middle Name:** |
| | **Last Name:** | Green | | | **Suffix:** |
| **Title:** | Executive Director | | | | |
| **Complete Address:** | | | | | |
| **Street1:** | 630 Drake Avenue | | | | |
| **Street2:** | | | | | |
| **City:** | Marin City | | **State:** | CA | |
| **Zip / Postal Code:** | 94965 | | **Country:** | | |
| **Phone Number:** | 415-336-6421 | | **Fax Number:** | | |
| **E-mail Address:** | terriegreen@marincityclimateresilience.org | | | | |

OMB Number: 4040-0004
Expiration Date: 12/31/2022

## Application for Federal Assistance SF-424

* 1. Type of Submission:
- [ ] Preapplication
- [x] Application
- [ ] Changed/Corrected Application

* 2. Type of Application:
- [x] New
- [ ] Continuation
- [ ] Revision

* If Revision, select appropriate letter(s):

* Other (Specify):

* 3. Date Received: Completed by Grants.gov upon submission.

4. Applicant Identifier:

5a. Federal Entity Identifier:

5b. Federal Award Identifier:

**State Use Only:**

6. Date Received by State:

7. State Application Identifier:

**8. APPLICANT INFORMATION:**

* a. Legal Name: Play Marin

* b. Employer/Taxpayer Identification Number (EIN/TIN): 831737141

* c. Organizational DUNS: 113073703

**d. Address:**

* Street1: 20 Pacheco Street
Street2:
* City: Marin City
County/Parish:
* State: California
Province:
* Country: USA: UNITED STATES
* Zip / Postal Code: 94965

**e. Organizational Unit:**

Department Name:

Division Name:

**f. Name and contact information of person to be contacted on matters involving this application:**

Prefix:
* First Name: Terrie
Middle Name:
* Last Name: Green
Suffix:

Title: Executive Director

Organizational Affiliation:

* Telephone Number: 415-336-6421
Fax Number:

* Email: terriegreen@marincityclimateresilience.org

## Application for Federal Assistance SF-424

*** 9. Type of Applicant 1: Select Applicant Type:**

Non-profit organization

Type of Applicant 2: Select Applicant Type:

Type of Applicant 3: Select Applicant Type:

* Other (specify):

*** 10. Name of Federal Agency:**

U.S. Environmental Protection Agency

**11. Catalog of Federal Domestic Assistance Number:**

66.034

CFDA Title:

*** 12. Funding Opportunity Number:**

EPA-OAR-OAQPS-22-01

* Title:

Enhanced Air Quality Monitoring for Communities

**13. Competition Identification Number:**

Title:

**14. Areas Affected by Project (Cities, Counties, States, etc.):**

Add Attachment | Delete Attachment | View Attachment

*** 15. Descriptive Title of Applicant's Project:**

Community-Led Air Quality Monitoring in Marin City

Attach supporting documents as specified in agency instructions.

Add Attachments | Delete Attachments | View Attachments

## Application for Federal Assistance SF-424

**16. Congressional Districts Of:**

* a. Applicant: CA-02 * b. Program/Project: CA-02

Attach an additional list of Program/Project Congressional Districts if needed.

Add Attachment | Delete Attachment | View Attachment

**17. Proposed Project:**

* a. Start Date: 11/2022 * b. End Date: 11/2024

**18. Estimated Funding ($):**

| | |
|---|---|
| * a. Federal | |
| * b. Applicant | |
| * c. State | |
| * d. Local | |
| * e. Other | |
| * f. Program Income | |
| * g. TOTAL | |

*** 19. Is Application Subject to Review By State Under Executive Order 12372 Process?**

- ☐ a. This application was made available to the State under the Executive Order 12372 Process for review on .
- ☐ b. Program is subject to E.O. 12372 but has not been selected by the State for review.
- ☑ c. Program is not covered by E.O. 12372.

*** 20. Is the Applicant Delinquent On Any Federal Debt? (If "Yes," provide explanation in attachment.)**

☐ Yes ☑ No

If "Yes", provide explanation and attach

Add Attachment | Delete Attachment | View Attachment

**21. *By signing this application, I certify (1) to the statements contained in the list of certifications** and (2) that the statements herein are true, complete and accurate to the best of my knowledge. I also provide the required assurances** and agree to comply with any resulting terms if I accept an award. I am aware that any false, fictitious, or fraudulent statements or claims may subject me to criminal, civil, or administrative penalties. (U.S. Code, Title 218, Section 1001)**

☑ ** I AGREE

** The list of certifications and assurances, or an internet site where you may obtain this list, is contained in the announcement or agency specific instructions.

**Authorized Representative:**

| | |
|---|---|
| Prefix: | |
| * First Name: | Terrie |
| Middle Name: | |
| * Last Name: | Green |
| Suffix: | |
| * Title: | Executive Director |
| * Telephone Number: | (415) 324-7080 |
| Fax Number: | |
| * Email: | terriegreen@marincityclimateresilience.org |
| * Signature of Authorized Representative: | Completed by Grants.gov upon submission. |
| * Date Signed: | Completed by Grants.gov upon submission. |

PLAY!/ MARIN

DIVERSITY
INCLUSION
PLAY

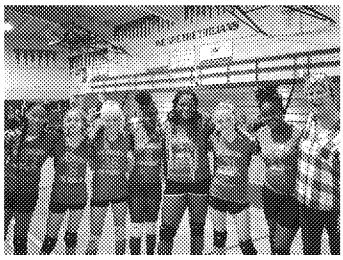
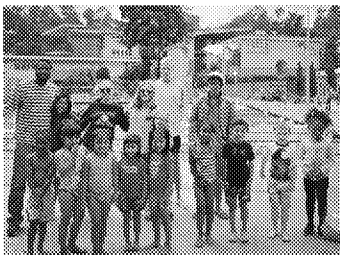
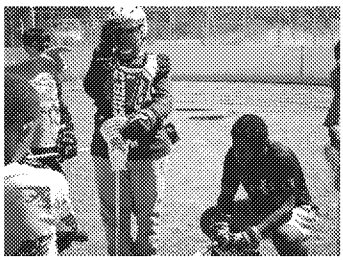
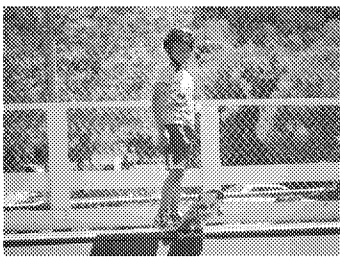
Play Marin intentionally provides opportunities for children of diverse ethnic and socioeconomic backgrounds in Southern Marin to learn and grow together through play.

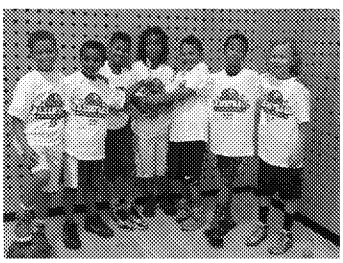
We operate in one of the wealthiest counties in the country, which is also the most racially disparate county in CA.

We recognize the need for stronger diversity and inclusion in Marin County, and we believe that bringing together the unique experiences of different cultures and socioeconomic backgrounds among us serves to enhance our larger community. Being able to understand and appreciate people from all walks of life is vital to the advancement of our society, and we see play as the vehicle to achieve this goal.

In just eight years, we have grown from one basketball team of nine players, to touching over 300 kids annually through several team sports and many other uplifting and enriching activities.

Our work teaches valuable skills, creates friendships, develops grit, brings families together, and enhances well being and solidarity among young people of Marin from all backgrounds, improving their prospects for a successful future and benefiting the overall health of our broader Marin community.



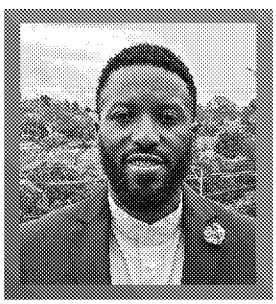
**TEAMS**

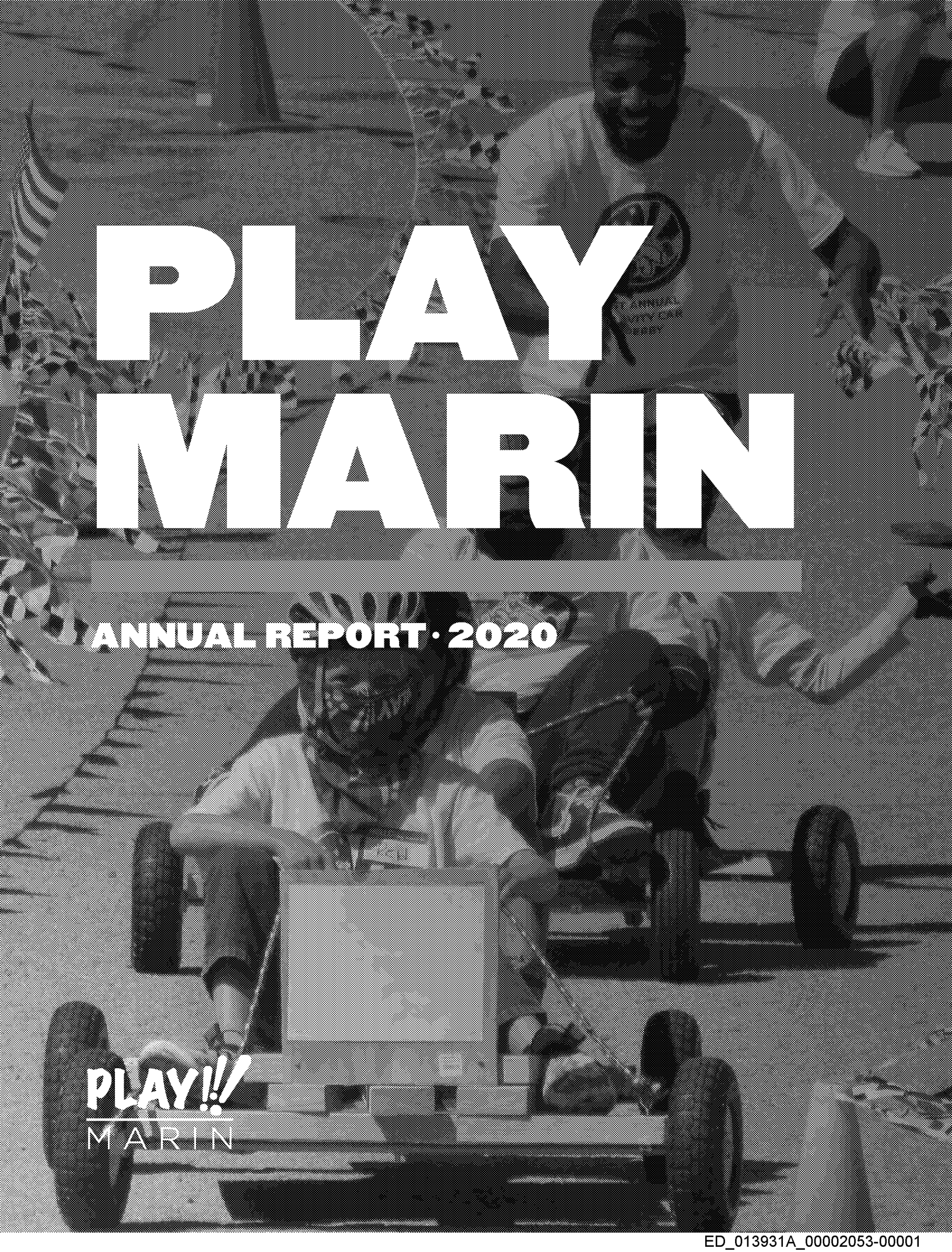
- Basketball
- Track & Field
- Girl's Volleyball
- Lacrosse

**ACTIVITIES**

- Swim lessons
- Skateboarding
- Mountain Biking
- Field trips
- Summer camps
- Sports clinics
- And many more!

Play Marin Founder & CEO Paul Austin is a longtime Marin City resident who has been a youth and community advocate for the majority of his professional life. After serving for several years as Director of Recreation for Marin City Community Center, Tamalpais High graduate Mr. Austin, who studied Early Childhood Education at Texas Southern University and holds a Bachelor's in Psychology from Dominican University in San Rafael, saw a need to create opportunities for Marin City youth to engage in organized athletics and other extracurricular activities.



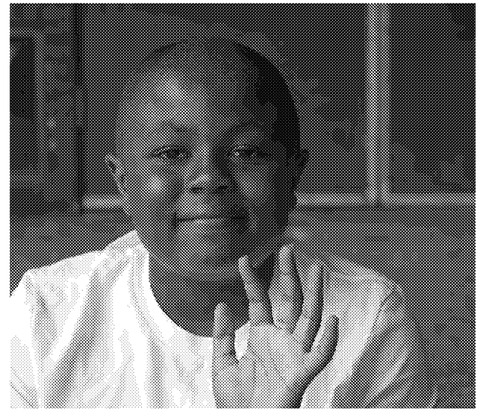


# PLAY MARIN

## ANNUAL REPORT · 2020

PLAY!// MARIN

# OUR MIS-SION



**Play Marin** seeks to level the playing field by providing equitable access to athletic and adventure opportunities for Marin City youth, and to further promote social change by creating opportunities for children of diverse racial, ethnic, and socioeconomic backgrounds to learn and grow together through play.

# OUR CHAL-LENGES

We operate in one of the wealthiest and most racially disparate counties in California. Our work addresses two fundamental challenges Marin youth face: Adequate access to athletic and extracurricular opportunity in Marin City, and lack of racial, ethnic, and socioeconomic diversity throughout Marin County.

**WE BELIEVE THAT Play is the Way TO MEET THESE CHALLENGES.**

We provide year-round programming to ensure children and teenagers are positively engaged with each other in enrichment activities throughout the school year and summer.

Starting in third grade, we recruit Marin City youth to our programs with the goal that each participant will enter high school with competitive skills in at least two sports, as well as experience in several of the enrichment activities commonly available to more financially privileged youth in our county, such as kayaking, golf, tennis, and surfing.

We involve young people from throughout Marin in our team sports and collaborative activities, and those of our partner leagues and providers, to ensure Marin youth grow up playing and working toward common goals with a diverse peer group.

# OUR STRAT-EGY

## OUR THEORY OF CHANGE

Closing the activity gap for youth of color in Marin City addresses a fundamental aspect of systemic racism in Marin County. Ensuring equitable access to sports, recreation, equipment, and facilities helps level the playing field for these young people when they enter high school, improving their prospects for a successful future.

Harnessing play as a tool for social change by bringing youth of diverse backgrounds together builds social connections and breaks down barriers and biases among communities. Play experiences that are intentionally diverse expand horizons and drive systemic change that supports diversity, equity, and inclusion.

### COMMUNITY NEEDS

1. **Play Gap:** Activities, experience, and facilities gap for Marin City Youth – a product of systemic racism.

2. **Diversity Challenge:** Lack of social connection among youth from diverse backgrounds – an opportuniy gap we need to address to collectively make social change in Marin County

### INTERVENTION

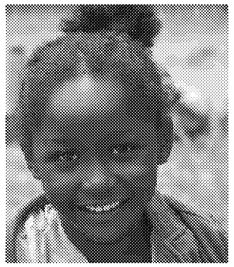
Provide sports, recreation, and enrichment activities, facilities, and equipment in Marin City to level the playing field and close the activity gap.

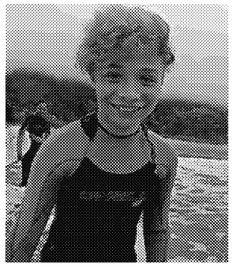
Intentionally bring youth and their families together from diverse backgrounds to learn and grow while connecting through play.

### INTENDED OUTCOMES

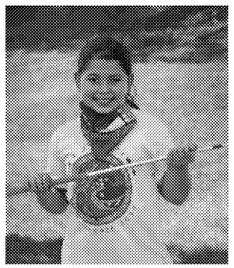
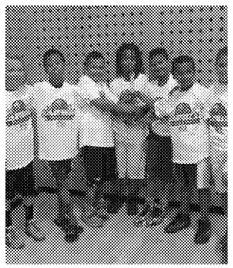
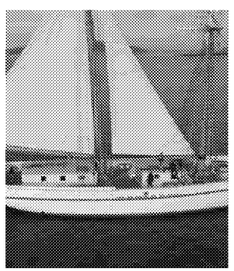
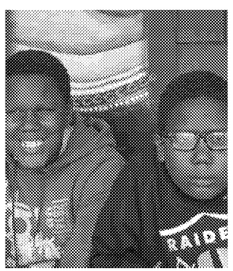
Marin City youth gain new experiences and personal growth. Marin City becomes an epicenter of sports and recreation with state-of-the-art facilities.

Play experiences that are intentionally diverse expand the participants' horizons and perspectives, build social connections, and ultimately drive systemic change that supports diversity, equity and inclusion.







## OUR PROGRAMS

Play Marin started in 2012 with one basketball team of nine players. Today, we reach over 300 kids annually through our team sports, individual athletics, and outdoor adventures.

**Team Sports**

Basketball
Girl's Volleyball
Track & Field
Lacrosse
Soccer

**Individual Sports and Outdoor Adventure**

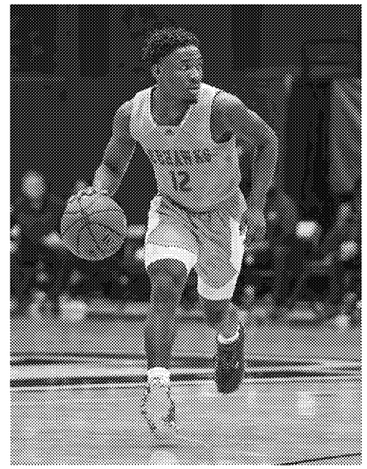
Golf
Kayaking
Mountain Biking
Sailing
Skateboarding
Surfing
Swim lessons
Sports Clinics
Tennis
Yoga

**Summer Camps**

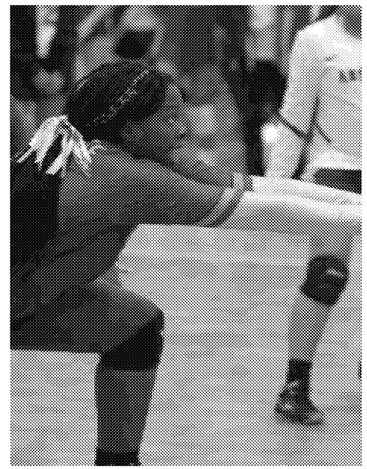
All of the above, plus Baseball, Field Trips, Nature Education, Art, Culture, STEM, and more

## PARTICIPANT HIGHLIGHTS

Born and raised in Marin City, **Darrion Trammell** started playing basketball as a young boy on one of Founder and CEO Paul Austin's teams as Play Marin was just getting started. Currently a Business Major at Seattle University and point guard for their basketball team, the Redhawks, Darrion is a multi-award winning NCAA Division I athlete. Just in his sophomore year, he is ranked 19th in the nation and 1st in his Conference for points scored per game. Darrion now enjoys volunteering with Play Marin programs whenever his schedule permits.



Seventh grader **Krystal Rose** was introduced to Volleyball by Play Marin three years ago. She showed such promise that after just one season she was recruited with a full scholarship to play year-round for the elite Absolute Volleyball Club. Krystal Rose has traveled to multiple states, her team has won Nationals, USA bids and multiple medals. One of the club's goals is to provide opportunities for highly skilled athletes to pursue college scholarships. Krystal Rose's Mom credits Play Marin for introducing her daughter to a sport that has already created so many new opportunities for Krystal Rose.



# 2020 A YEAR UNLIKE ANY OTHER.

Despite having to halt team sports due to the pandemic, we are proud to have served over 235 young people with enrichment activities throughout the year, while also providing pandemic-related support to many families in our community.

We kicked off 2020 with another successful basketball season in full swing. Our three K-2nd grade teams were enjoying their games, and six of our twelve 4th-8th grade teams were headed to the playoffs for the 2019 CYO Championships, the weekend the stay at home orders went into effect due to COVID-19.

**We met the moment.** When the stay-home orders were first issued, we created a designated fundraiser to help feed Marin City families most immediately affected by the pandemic. From March through July, we provided 60,000 meals to 300+ families, purchased from local restaurants struggling to stay in business.

**We turned crisis into opportunity.** With team sports off the table, we kept our young people active, healthy, and engaged by introducing new, Covid-safe activities such as golf, kayaking, mountain biking, sailing, skateboarding, surfing, tennis and yoga. When summer came along we adjusted our usual camp programming to follow CDC guidelines while keeping the focus on fun and community.

We began closing the facilities gap by leading an initiative to refurbish the Marin City Recreation Center. In partnership with The Warriors Community Foundation, Good Tidings Foundation, LIFEWTR, Jennifer Azzi, and the MCCSD, we remodeled the gym, installing a new floor, upgrading the lobby, and, with the help of our new partner IKEA, remodeling the kitchen and refurbishing the Teen Center game room.

**We helped drive educational equity.** We served as the fiscal agent, managing entity, and recreation provider for the Marin City Learning Hubs, an effort to ensure that academic support was available to Marin City middle schoolers who otherwise would not have had access to these services so crucial to their ability to thrive.

## OPERATIONS

Play Marin began as the vision of one individual, CEO and Founder Paul Austin, who launched the program in 2012 with just one basketball team of nine players. Through his dedicated stewardship and the generosity of private donors and area specialists and partners, Play Marin has grown to serve over 300 kids annually through multiple team sports and enrichment activities.

From its earliest inception, Play Marin has survived and thrived through the generous support of private donors, grants, and foundations to provide our operating expenses. We are a small team of two paid staff, three board officers, pro-bono legal and financial advisors, summer employees, and a dedicated volunteer group of coaches and marketing and development professionals. The efficiency of our team and our ability to leverage our vast partnership network helps ensure the effectiveness of the donations we receive in supporting the programs we create for the young people we serve.

## COMMUNITY

**All Star Team**
Members of the Play Marin All Star Team are the generous donors who fund our operating costs. More than just financial supporters, these are some of our most loyal teammates and outspoken champions. Nine new members joined our All Star Team in 2020.

**MVPs, our Partners**
We work with many generous, creative, and talented partners from throughout Marin who support our mission of inclusion and diversity through play. They show allegiance to our cause in countless ways— lending their talent as coaches and instructors, raising awareness, collaborating on special events, providing adventure opportunities and related equipment, and so much more.

**Team Captains**
Our valued volunteer leads who lend their professional expertise and donate their time providing creative direction, communications, development, event planning, producing The Playbook newsletter, public relations, social media management, videography, and website engineering.

**All League Players**
The people of all ages in our Play Marin family who amplify our mission, volunteer their time and labor when needed for special events and initiatives, donate what they can or create their own fundraisers to benefit our programs, make signs and march with us in peaceful protests, and our School & Community Ambassadors, who are so effective in spreading the Play Marin message that in 2020 we doubled our mailing list.

## LEADERSHIP

*Paul Austin,* Founder and CEO
*Cerella Hampton,* Chief of Staff
*Bruce Edwards,* Board Chair
*Roxie Baker,* Board Secretary
*Lawrence Bancroft,* Board Treasurer

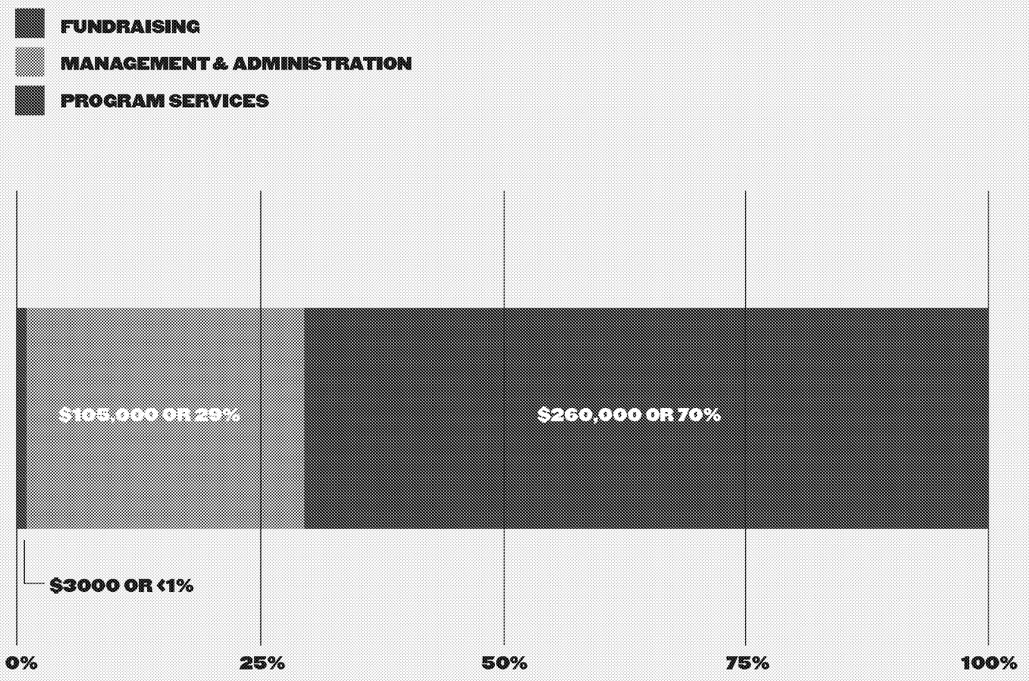
## IMPACT PARTNERS

Bambini Yoga Project
Brand Marinade
Bridge the Gap College Prep
Call of the Sea
County Bears AAU Basketball
Dave Frommers Soccer
Fairfax Scoop
Good Tidings Foundation
The Hannah Project
Jennifer Azzi, Azzi Academy Camps
Ikea
Lululemon
Marin City Community Services District
Marin City Library
Marin County Cooperation Team
Marin Outdoor Adventure
Mill Valley Scouts
Next Level Flag Football
Performing Stars of Marin
ProofLab
St Mary Star of the Sea
Sausalito Marin City School District
Sea Trek
Shore Up Marin City
Southern Marin Aquatics
Southern Marin Lacrosse
Sports Basement
Tamalpais Union High School District
Trips4Kids
Warriors Community Foundation
Wise Girls

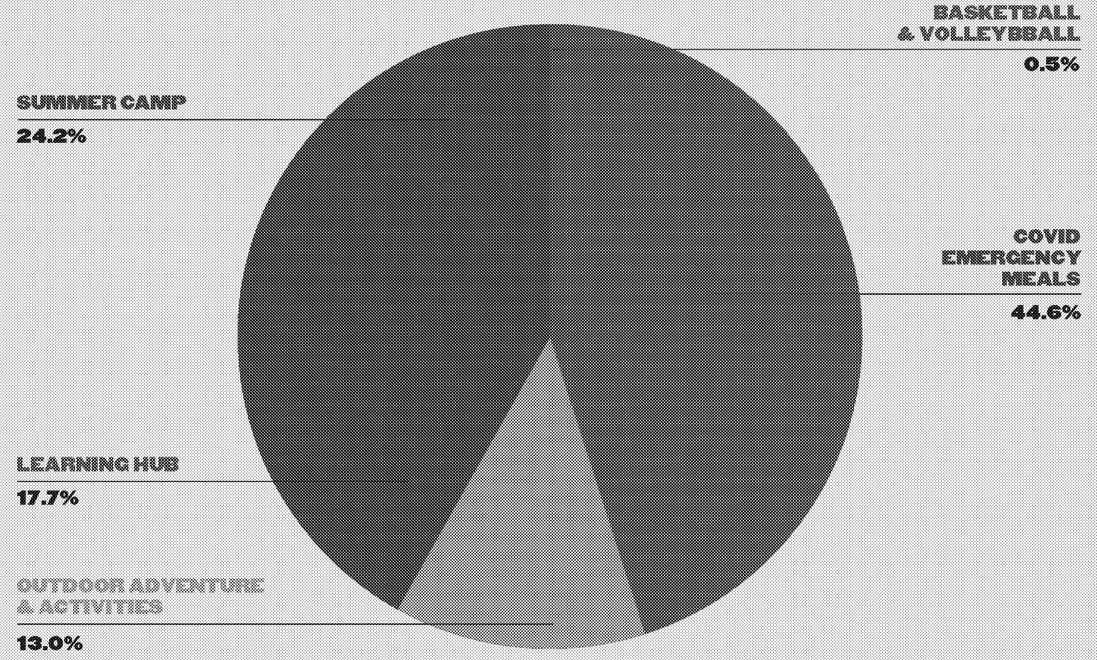
# 2020 FINANCIALS

Total Donations $675,000
Total expenses $368,000

## ALLOCATION OF EXPENSES FOR CALENDAR YEAR 2020




## EXPENDITURE BY PROGRAM




© Play Mario 2021

# BUDGET INFORMATION - Non-Construction Programs

OMB Number: 4040-0006
Expiration Date: 02/28/2022

## SECTION A - BUDGET SUMMARY

| Grant Program Function or Activity (a) | Catalog of Federal Domestic Assistance Number (b) | Estimated Unobligated Funds | | New or Revised Budget | | |
|---|---|---|---|---|---|---|
| | | Federal (c) | Non-Federal (d) | Federal (e) | Non-Federal (f) | Total (g) |
| 1. Air Quality Monitoring | 66.034 | $ | $ | $ 176,898 | $ 160,000 | $ 336,898 |
| 2. Community Engagement | 66.034 | | | 200,430 | | 200,430 |
| 3. Data Processing, Analysis, and Interpretation | 66.034 | | | 61,250 | | 61,250 |
| 4. Modeling | 66.034 | | | 61,250 | | 61,250 |
| 5. Totals | | $ | $ | $ 499,828 | $ 160,000 | $ 659,828 |

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Prescribed by OMB (Circular A -102) Page 1

## SECTION B - BUDGET CATEGORIES

| 6. Object Class Categories | GRANT PROGRAM, FUNCTION OR ACTIVITY (1) Air Quality Monitoring | (2) Community Engagement | (3) Data Processing, Analysis, and Interpretation | (4) Modeling | Total (5) |
|---|---|---|---|---|---|
| a. Personnel | $ 79,980 | $ 120,000 | $ | $ | $ 199,980 |
| b. Fringe Benefits | 14,396 | 21,600 | | | 35,996 |
| c. Travel | | | | | |
| d. Equipment | 71,272 | | | | 71,272 |
| e. Supplies | | 2,000 | | | 2,000 |
| f. Contractual | 11,250 | 35,830 | 61,250 | 61,250 | 169,580 |
| g. Construction | | | | | |
| h. Other | | 21,000 | | | 21,000 |
| i. Total Direct Charges (sum of 6a-6h) | | | | | $ |
| j. Indirect Charges | | | | | $ |
| k. TOTALS (sum of 6i and 6j) | $ 176,898 | $ 200,430 | $ 61,250 | $ 61,250 | $ 498,828 |
| 7. Program Income | $ | $ | $ | $ | $ |

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## SECTION C - NON-FEDERAL RESOURCES

| (a) Grant Program | (b) Applicant | (c) State | (d) Other Sources | (e)TOTALS |
|---|---|---|---|---|
| 8. Air Quality Monitoring | $ | $ | $ 160,000 | $ 160,000 |
| 9. Community Engagement | | | | |
| 10. Data Processing, Analysis, and Interpretation | | | | |
| 11. Modeling | | | | |
| 12. TOTAL (sum of lines 8-11) | $ | $ | $ | $ |

## SECTION D - FORECASTED CASH NEEDS

| | Total for 1st Year | 1st Quarter | 2nd Quarter | 3rd Quarter | 4th Quarter |
|---|---|---|---|---|---|
| 13. Federal | $ | $ 121,966.50 | $ 53,944.50 | $ 53,944.50 | $ 53,944.50 |
| 14. Non-Federal | $ | 20,000 | 20,000 | 20,000 | 20,000 |
| 15. TOTAL (sum of lines 13 and 14) | $ | $ 141,966.50 | $ 73,944.50 | $ 73,944.50 | $ 73,944.50 |

## SECTION E - BUDGET ESTIMATES OF FEDERAL FUNDS NEEDED FOR BALANCE OF THE PROJECT

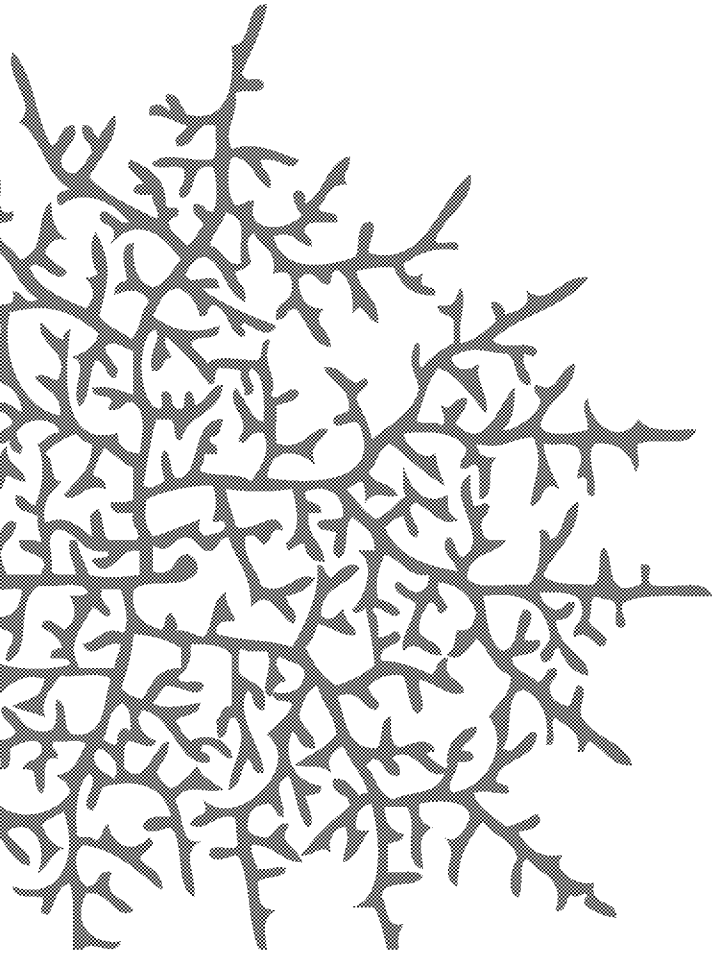
| (a) Grant Program | FUTURE FUNDING PERIODS (YEARS) (b)First | (c) Second | (d) Third | (e) Fourth |
|---|---|---|---|---|
| 16. Air Quality Monitoring | $ 121,085 | $ 55,813 | $ | $ |
| 17. Community Engagement | 100,215 | 100,215 | | |
| 18. Data Processing, Analysis, and Interpretation | 30,625 | 30,625 | | |
| 19. Modeling | 30,625 | 30,625 | | |
| 20. TOTAL (sum of lines 16 - 19) | $ 282,550 | $ 217,278 | $ | $ |

## SECTION F - OTHER BUDGET INFORMATION

21. Direct Charges:

22. Indirect Charges:

23. Remarks:



hyphæ design laboratory

Ecological Design & Engineering

# CONTENTS

# FIRM PROFILE

## HYPHAE DESIGN LABORATORY

The Hyphae Design Laboratory (Hyphae) is an ecological engineering and design firm dedicated to creating innovative green infrastructure. Hyphae's multi-disciplinary team works to blend landscape architecture and civil engineering, turning multi-faceted engineering challenges into elegantly designed ecosystem solutions.

Hyphae's focus on ecologial design has resulted in a diverse body of work. From landscapes to living roofs, mechanical and biological water treatment systems, to art projects uniting infrastructure with public space. Hyphae's work ranges in scale from residential to commercial, institutional, and municipal design. Working in both urban and rural landscapes, Hyphae has successfully managed the design phase of construction projects ranging from $25,000 to $100 million.

Working diligently with permitting agencies and regulators, Hyphae has pioneered new code acceptance for innovative green infrastructure. This includes groundbreaking rainwater catchment systems and wastewater reuse for landscape irrigation in the public realm.

## SERVICES

Hyphae provides a range of services from concept to construction. Research, the design of functional and regenerative ecosystems, and architectural design and engineering consultation represent the core of Hyphae's work. In addition, product design, scientific research, and art installations are our secondary focus. Hyphae's core services include:

- Civil Engineering
- Sustainable M/E/P Engineering
- Green Infrastructure Design & Engineering
- Landscape Design including Living Roofs & Walls
- Masterplanning
- Ecosystem Service Modeling
- Ecological Restoration
- Community Outreach & Community Based Design

# *Cities are a sickness & Nature is our drug*

### The Problem

Most humans live in cities and are exposed to environmental conditions that our bodies have not evolved to deal with physically or psychologically. As a result, medical research is showing our *exposome* is having an increasingly greater impact on health than our *genome.* Adapting cities, not just to mitigate climate change, but also improve ecosystem health, is the greatest financial, engineering and existential challenge to humanity.

### Our Solutions

Hyphae is an interdisciplinary innovation firm based in Oakland that develops and deploys novel, performative urban infrastructure technology and tools to model, manage, measure and monetize urban ecosystem health. Brent will frame the science and solutions to our urban health crisis through two innovative projects *AdaptOakland* in Oakland and *Greenheart* in Louisville, Kentucky, where they have launched the first NIH funded clinical trial on urban greening.

### Flagship Projects

**Adapt Oakland** is a novel, multibenefit ecosystem service and health-based adaptive management platform for implementing green infrastructure in West Oakland, as well as a toolkit for other neighborhoods with high impact from Port, T.O.D. and industrial land uses. The project was developed in partnership with West Oakland Environmental Indicators Project (WOEIP) and funded by the Governor's Office of Research & Planning. Brent will discuss the plan and multiple ongoing subprojects including a neighborhood specific citizen science and greening designs, as well as community-based air quality planning with AB 617. adaptoakland.org

**Greenheart** is a research study developed in partnership between Dr. Aruni Bhatnagar, the director of the Envirome Institute at the University of Louisville and Hyphae Design Laboratory. *Greenheart* is one of the first longitudinal clinical trials to evaluate the health impacts of urban greening, and will look specifically at cardiovascular health outcomes as well as other enviro-pyscho-social determinants of health. The project is supported by the National Institute of Health (NIH) and The Nature Conservancy and a diverse team of researchers. http://louisville.edu/greenheart

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# *Brent Bucknum*

## Founder - Hyphae Design Laboratory

Brent has been a leader in the urban environmental engineering field for nearly two decades, developing iconic, innovative and impactful green infrastructure projects throughout the country. As an urban ecologist, Brent's work aims to improve the health and diversity of all species in the urban environment, but with a particular focus on cities' dominant megafauna; humans. Brent Bucknum is the founder of Hyphae Design Lab, an Oakland based multi-disciplinary engineering and innovation firm started in 2008. Brent also co-founded Urban Biofilter, an environmental justice and health focused research and policy joint venture developed with neighborhood environmental justice groups. Brent brings a systems thinking perspective to environmental health and urban infrastructure challenges, by building diverse teams to create practical solutions to global challenges through academic research, community participation, design innovation, earth systems engineering and public policy. Brent also lectures, researches, and advocates in California and throughout the US for how urban infrastructure planning can provide multi-ecosystem benefits that improves air, soil,water and human health and environmental justice.

Brent's work brings together academic research, ecosystem innovation, environmental justice, green infrastructure engineering and public health. Brent's projects range from museums such as the Academy of Sciences green roof and the SFMOMA living wall in San Francisco to large scale urban masterplans and complex technical green infrastructure engineering projects ranging from Arlington Cemetery to the LA River. Before focusing on design and engineering, Brent also has a background in environmental planning, as well as bioremediation, wetland ecosystems assessment and mitigation.

*You can read more details about Brents research, conferences and presentation history in his National Science Foundation BioSketch: Brent Bucknum: Biosketch*

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# *Daniel Fleischer*

## Chief Science Officer

Daniel Fleischer is the Chief Science Officer at Hyphae Design Laboratory. Trained as a scientist and engineer, he enjoys developing new technologies to integrate sustainability and health at multiple spatial and temporal scales. During his time at Hyphae he has developed processes (and associated monitoring and control systems) for air-biofiltration, rainwater management, grey-water/black-water treatment & recycling, precision ecosystem mapping robots, and real-time data analytics engines. Prior to working at Hyphae, Daniel developed novel systems for the economic and sustainable production of large amounts of food and fuel via cultivation of marine mico-algae. Before that he performed basic neurochemistry research on the molecular and biophysical mechanisms of consciousness. Fletch holds over 10 patents in biological processes and environmental engineering.

*You can read more details about Fletches research, conferences and presentation history in his National Science Foundation BioSketch: Daniel Fleischer: Biosketch*

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# *Mei Visco*

## Urban Ecologist & Researcher

Mei conducts scientific research in the areas of air quality monitoring, LiDAR sensing, and pollution mitigation. Mei also serves as project manager and designer, helping create ecosystem driven design solutions for green infrastructure projects in partnership with communities.

Mei created her own interdisciplinary, individual major at U.C, Berkeley Green Infrastructure Design that combines architecture, landscape architecture, sustainable design, and plant science with the goal of learning to design and build green walls and roofs. Thesis work for this major focused on the study of cliffside ecology and its application to the urban environment, and includes both analysis of existing research and field work.

# *Ivan Heitmann*

## Digital Landscape

Ivan Heitmann is trained as a landscape architect but has skill sets in a wide variety of technical realms. His particular interests are in landscape systems and the people that inhabit them. His experience extends to hands-on work in construction and vernacular landscapes such as urban agriculture. Ivan has a 3-year Master's degree in Landscape Architecture from the University of Washington and background in the humanities. Over 8 years in practice, his attention has been drawn to a design process with technical performance in mind. Ivan excels at complex software driven modeling and the development of digital twins from the evaluation of complex environmental data and the performance of urban ecosystems with a focus on parametric modeling, urban microclimate modeling, and

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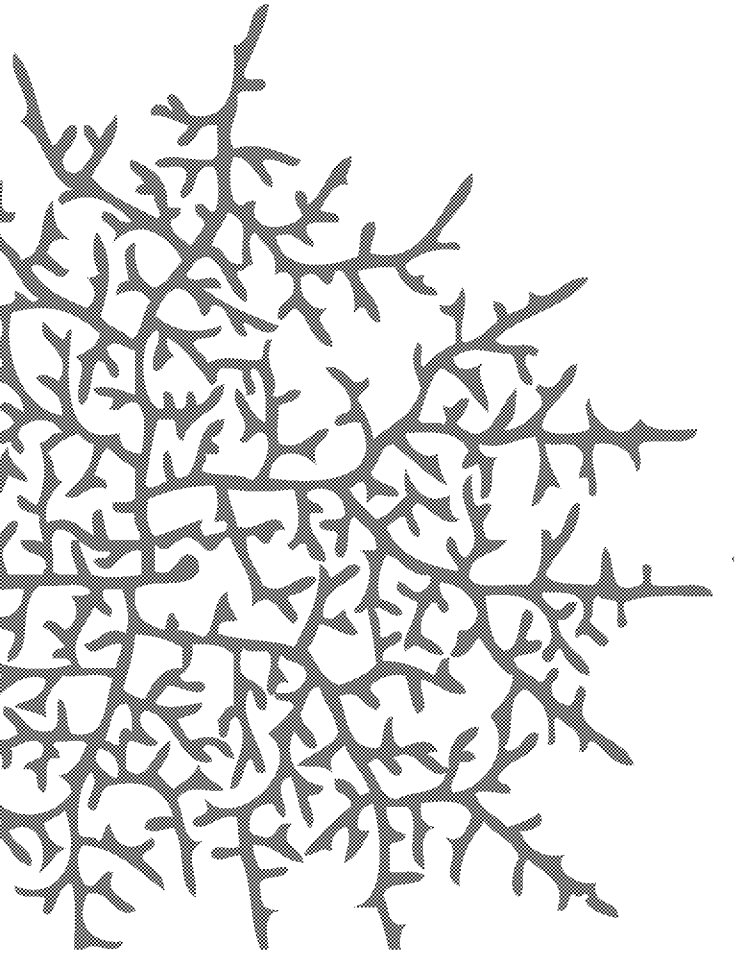
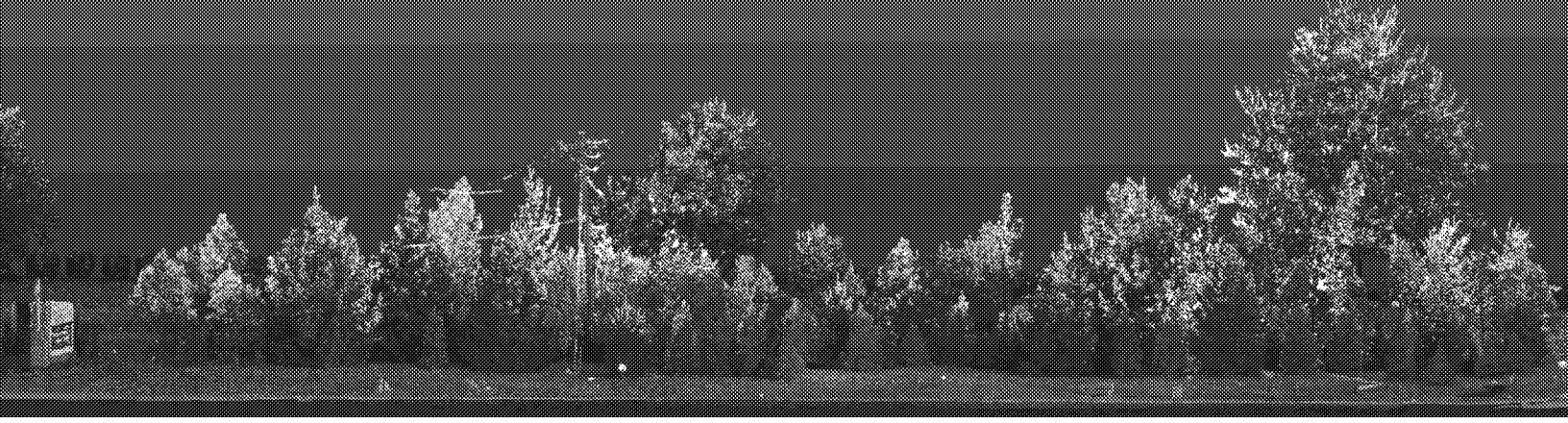
# SELECTED PROJECTS



# ADAPT OAKLAND

**Location I** Oakland, CA
**Client I** CA Strategic Growth Council
**Project Lead I** Urban Biofilter
**Year Completed I** 2015
**Description I** Adapt Oakland is a greening plan that identifies environmental hazards and pairs them with adaptation strategies to create a healthier, more sustainable urban environment. These strategies can best be described as interventions to develop green infrastructure that uses biological and ecological systems to provide ecosystem services vital to our urban environment, such as clean air, soil, and water. Additionally, such interventions serve to mitigate the effects of extreme temperatures and lower the risk of flooding and contamination, both of which are projected to increasingly impact communities as a consequence of global climate change. Hyphae Design Lab was a consulting engineer for Adapt Oakland and provided green infrastructure strategies appropriate for West Oakland and ecosystem service calculations for the strategies.



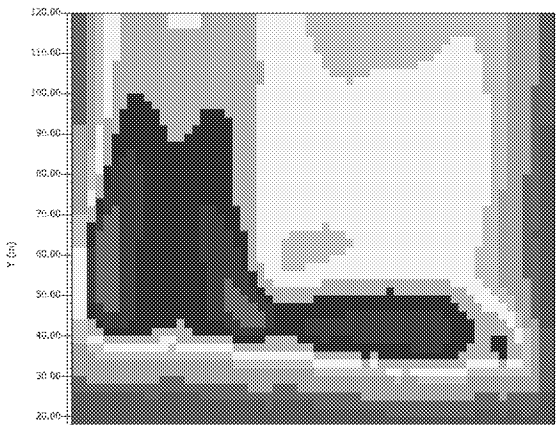
# GREEN FOR GOOD

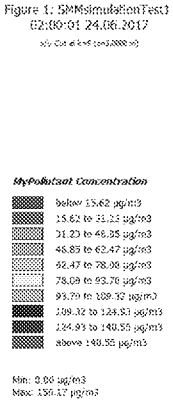
**Location** | Louisville, Kentucky
**Client** | Louisville Metro
**Design Lead** | Hyphae Design Laboratory
**Timeline** | 2015

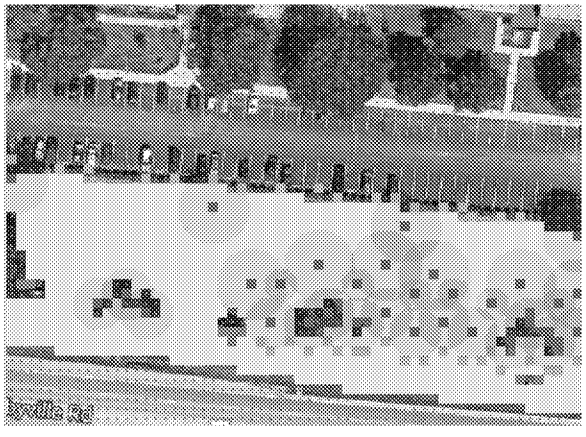
Louisville Metro Government's Office of Sustainability and its partners embarked on an exciting project called Green for Good: to strategically unite interrelated sustainability efforts and to connect the dots between investing in greening strategies and quantifiable health impacts. The Office partnered with Hyphae Design Lab, Institute for Healthy Air Water and Soil, University of Louisville and Washington University in St. Louis to leverage their innovative work around assessing environmental conditions and human health risks. Extensive research supports the fact that human health is significantly impacted by the built and natural environment. Exposure to vegetation is reported to reduce stress, improve health perceptions and protect against cardiopulmonary disease. This effect is thought to be due in part to associated reductions in exposure to air pollution; various types of vegetation are known to capture air pollution.

The overall goal of the Green for Good project was to examine how vegetation may be utilized to reduce exposure to traffic pollutants and to test the idea that a greener neighborhood is a healthier neighborhood. The project was conducted at St. Margaret Mary School and a vegetated buffer (biofilter) was installed and configured to reduce exposure of the students and staff to traffic related air pollutants. Air sampling was conducted before and after the planting to see how the trees affected pollution levels. A cohort of 60 students and 24 adults volunteered to provide blood and urine samples both before and after the planting. The samples were evaluated for levels of circulating angiogenic cells and immune cells as well as other health indicators.

The air monitoring data showed that under certain conditions, particulate pollution was 60% lower immediately behind the biofilter. The health monitoring showed that among the study participants, levels of circulating angiogenic cells were higher after the biofilter was planted. These cells keep blood vessels healthy. When a person has higher levels of these cells, they have a lower risk of heart disease. We also found that levels of immune cells were lower after planting.





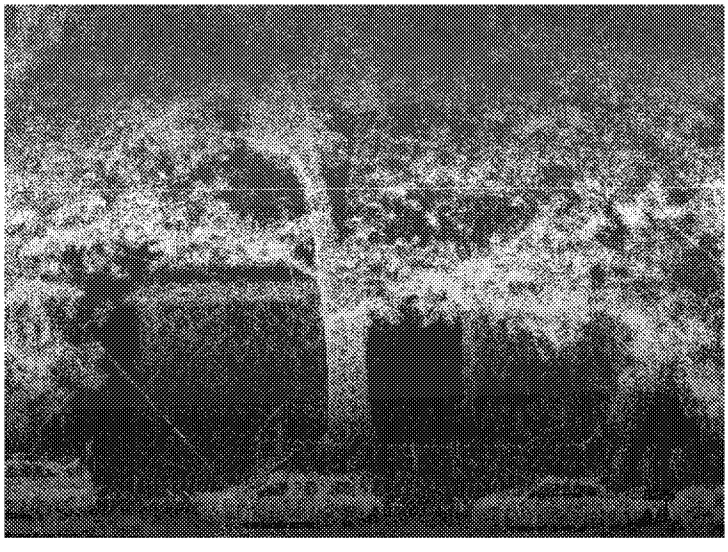



# GREEN HEART

Location | Louisville, Kentucky
Client | University of Louisville
Design Lead | Hyphae Design Laboratory
Timeline | 2019-

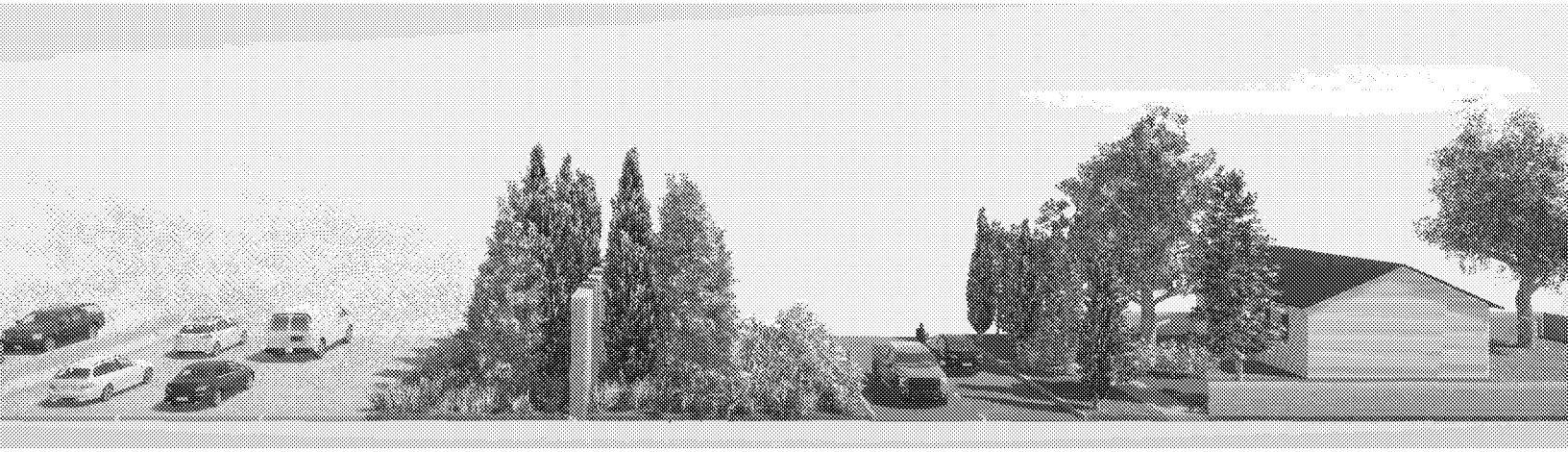
Hyphae Design Laboratory is working with the University of Louisville's Envirome Institute, The Nature Conservancy (TNC), National Institute of Health (NIH), Washington University, and other partners on a multi-year study to determine if dramatically increasing vegetation through the planting of thousands of trees in the South Louisville study area positively impacts the resident's cardiovascular health.

Existing research—including a pilot study in Louisville—supports a link between urban greening and health outcomes. However, the Green Heart Project is the first controlled experiment to test urban greening in the same way a new pharmaceutical intervention is tested.




The focal point of the project is a five-year health study. First the research team will assess the risk of diabetes and heart disease, stress levels, and the strength of social ties in 700 participants from the neighborhood. The team will take baseline measurements of air pollution levels at the same time.

The project team is considering parts of several neighborhoods of South Louisville. Over a two year timeframe, the team is working with community members, agencies and non-profit organizations to collaboratively design and plant thousands of trees, grasses, vines and shrubs (many of them mature specimens) throughout the community to enhance the urban ecosystem, promote physical activity while decreasing stress and physically buffering and filtering air pollution. Over the following three years, roughly 700 participants, (enough for the research to be significant) will receive annual check-ups to evaluate how the increasing greenery has affected their physical and mental health, and their social ties.



# BROADWAY ALL THE WAY

Location | Louisville, Kentucky
Client | Louisville Metro
Lead | Gresham Smith & Partners
Project Completion Date | 2020 (Current)

Hyphae Design Laboratory is working with a national team led by Gresham Smith to develop a master plan for Broadway, one of Louisville's most important east-west connectors and a critical transit route extending six miles east to west on the southern edge of the central business district. The corridor was also intended to be an Olmsted Parkway, but the plan never materialized. Our winning vision was to reimagine Olmsted's intent but with a 21st century perspective, transforming the corridor from its existing auto-centric form into a multi-modal complete street that integrates principles of connectivity, sustainability, health, authenticity, and equity.

Through analysis, community engagement, and collaboration with team partners, Hyphae is working to not only create a great multimodal streetscape but a new environmental health framework that ensures the efficient stacking and integration of ecological services in tandem with transit and infrastructure improvements that address sustainability issues related to air and water quality, human health, and biodiversity. From employing the latest scientific research into effective ways to mitigate traffic induced airborne pollution to addressing the urban heat island effect and preparing the corridor for increased rainfall and hotter dry seasons, Hyphae is designing in the necessary components to recreate a Broadway that will be a model for transportation networks of the new century.